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28 June 1985

USSR Report

LIFE SCIENCES

BIOMEDICAL AND BEHAVIORAL SCIENCES

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USSR REPORT

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UDC 633.15:575.1.14:576.312.32

NATURE OF HETEROCHROMATIC KNOB REGIONS IN CORN CHROMOSOMES. II. NATURE OF CHANGE IN KNOB REGIONS UPON INBREEDING

Moscow GENETIKA in Russian Vol 20, No 10, Oct 84 (manuscript received 4 Nov 83) pp 1649-1662

POKHMEL'NYKH, G. A. and SHUMNYY, V. K., Institute of Cytology and Genetics, Siberian Department, USSR Academy of Sciences, Novosibirsk

[Abstract] An analysis is presented of the nature of chromosomal rearrangement, including heterochromatic knob regions, the change in their state in the process of inbreeding, in order to study its influence on polymorphism based on heterochromatic knob regions of a multiple-node line of maize. Three groups of plants of different degrees of inbreeding from two initial plants 41/21 and 41/23 were analyzed. Two or three preparations consisting of a mixture of anthers of two or three blossoms with relatively different stages of meiosis were prepared and examined. The three groups of plants of line 41 differed only in degree of inbreeding. The data obtained on variation in the state, number and dimensions of homologous knob regions are of interest in connection with the level of polymorphism of heterochromatic knob regions in self-pollinated lines of cross-pollinating plant species. Cases of changes in the pachyten state, number or size of knob regions are observed in the inbred plant meiocytes in one or both homologous chromosomes. The process of self-pollination can result in homozygotization of initially heterozygous chromosomes and differentiation of self-pollinating lines of the same origin in chromosome structure. Heteromorphism and heterozygoteness may arise again at the knob regions, however. This is an active process, leading to a change in the heterochromic knob regions within two to three generations of inbreeding. Figures 6; references 37: 4 Russian, 33 Western.
[125-6508]

UDC 633.14:631.524.6.01

HEREDITY OF ISOENZYME ESTERASE IN RYE KERNELS

Moscow GENETIKA in Russian Vol 20, No 10, Oct 84 (manuscript received 12 Sep 83) pp 1671-1677

KUDRYAKOVA, N. V., All-Union Scientific Research Institute of the Plant Industry imeni N. I. Vavilov, Leningrad.

[Abstract] A study is presented of the genetic control of rye esterase in a dry kernel endosperm. Use of this tissue for analysis avoids the influence of ontogenetic variability and simultaneously preserves the buds for further study. Isoelectro-focusing in polyacrylamide gel plates was used. Hybridologic analysis indicates that all molecular forms of the esterase in the endosperm are coded by the two nonlinked loci EstA and EstB. The EstA enzyme includes at least five codominant alleles. The EstB gene consists of two alleles, an active one which codes an isoform doublet, and a recessive null allele. The concept of 'null allele' means only that the products controlled by this allele are not revealed in enzymograms by histochemical staining. Figures 2, references 13: 2 Russian, 11 Western.
[125-6508]

BIOCHEMICAL AND CYTOGENETIC MANIFESTATION OF CYTOPLASMIC MALE STERILITY IN PLANTS

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 18, No 5, Sep-Oct 84) pp 392, 395 (review of Biokhimicheskiye i Tsitogeneticheskiye Osobennosti Tsitoplazmaticheskoy Muzhskoy Steril'nosti Ozimoy Pshenitsy - Kiev Nauk Dumka Press, 1983, 119 pages, by DMITRIYEVA, A. N., BORISENKO, L. R. and SAVCHENKO, N. I.)

ALEKSEYEVA, Ye. S. (Reviewer)

[Abstract] The book summarizes results of cytogenetic and biochemical study of male sterile analogs, sterility inducers, fertility restorers and forms with restored fertility of pollen in soft winter wheat. Based on a cytologic study of the appearance of cytoplasmic male sterility in wheat or wheat plants, the authors show that regardless of the source and the type of sterility, meiosis occurs without significant disruption. A generation of the pollen begins when the young mixospores leave the maternal pollen cells. The disruption of metabolism leading to pollen degeneration is manifested as suppression of the intensity of biochemical processes and is related to the regulatory mechanism of activity of the genetic apparatus. The authors demonstrate that when dominant alleles of Rf genes are introduced to the cytoplasm of T. timopheevi, the physiological-biochemical processes in the pollen normalize.
[073-6508]

UDC 59.082.2:595.754:591.34

ARTIFICIAL NUTRIENT MEDIA FOR GROWING LARVAE OF PREDATORY BUGS OF PENTATOMIDAE FAMILY

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 64, No 1, Jan 85 (manuscript received 12 Dec 83) pp 117-123

KHLISTOVSKIY, Ye D., OLESHCHENKO, I. N., SHIRINYAN, Zh. A. and ISMAILOV, V. Ya., North Caucasian Scientific Research Institute of Phytopathology, Krasnodar

[Abstract] Predatory bugs Arma custos F. and Podisus maculiventris Say. have attracted the attention of researchers as potential entomophages of the Colorado beetle and other arthropods (Puchkov, 1961; Tarabayev, 1977; Golubeva et al., 1980; Valsova et al., 1980; Gusev et al., 1980, Polyakov et al., 1980, etc.). In view of this, development of means of mass propagation of these bugs so they can be released to control crop pests is very important (Izhevskiy, Ziskind, 1981, 1984). Study of the possibility of growing A. custos F. and P. maculiventris Say. on different semisynthetic nutrient media showed that they can be grown on some of the studied nutrient media with different bases. The highest rate of larval growth was obtained on a medium based on Trichogramma production wastes in the form of grain moth butterflies frozen in liquid nitrogen. The importance of cost during mass production of entomophages on an artificial nutrient medium and ways to reduce such costs are discussed. The composition of media used in the study and methods of their preparation are described. References 27: 18 Russian, 9 Western.
[1812-2791]

UDC 577.3:631.811.93.98

EFFECTS OF BIOACTIVE ORGANOSILICON COMPOUNDS ON ESR SPECTRA OF GRAIN CROP MEAL

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR, SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 2, Feb 85 (manuscript received 7 Jun 84) pp 73-76

RUSIN, G. G., BIDZILYA, N. I. and TARUSINA, V. N., Ukrainian Agricultural Academy, Kiev

[Abstract] ESR analysis was conducted on the effects of seed pretreatment with bioactive organosilicon compounds prior to planting, as well as on the effects of using such compounds for the encapsulation of controlled-release fertilizers, employing buckwheat, corn and wheat meals for analysis. The general formula for the organosilicon compounds was $[(CH_3)_nSiOCl_{3-n}]_m$ (94-96 wt%) + $(CH_3)_2Cl$ (3-5 wt%), with n = 1 or 2 and m = 2 to 5, and the remainder of the composition consisting of chlorosilanes and trace admixtures. In both cases exposure to

the organosilicon compounds promoted an increase in the organic free radicals in the meal, indicating enhancement of metabolic activity in the grain as well as accelerated maturation of the plants. The net effect was a gain in harvest and a shortened vegetation period. Figures 2; references 11: 9 Russian, 2 Western.
[1809-12172]

UDC 633.11:631.524.86:632.752.2

WHEAT IMMUNITY IN INTERACTION WITH PATHOSYSTEMS OF SITOBION AVENAE F., RHOPALOSIPHUM PADI L. AND/OR PUCCINIA TRITICINA ERIKSS

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 2, Feb 85) (manuscript received 2 Aug 84) pp 52-55

NIKOLENKO, M. P. and OMEL'CHENKO, L. I., All-Union Breeding and Genetics/ Institute, Odessa

[Abstract] Hard (Odessa) and soft (Kavkaz) wheat was infected either with the brown rust agent (Puccinia triticina) or infested with aphids (Sitobion avenae, Rhopalosiphum padi) or subjected to a combination of both factors to determine the effectiveness of plant immunity. The outcome of the infections was found to be predicated on metabolic changes in the plant which, in the case of combined aphid-brown rust attack, resulted in relationships that ranged from a neutral state to commensalism between the pathogens. As the number of aphids increased the interrelationship became a competitive one. The competitive aspects presumably account for the fact that outbreaks of both types of pathology are seldom simultaneous, and emphasize the importance of ecologic factors whenever assessment of wheat resistance to a given pathogen has to be made. On a broader scale, it is evident that breeding and selection of crops has to take into consideration the regional ecologic balance of the various phytopathogens (viruses, insects, fungi, etc.). References 16: 15 Russian, 1 Western.
[1056-12172]

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28 June 1985

UDC 632.75:632.95.024.2

GENETICS OF PESTICIDE RESISTANCE IN GREENHOUSE WHITEFLY (TRIALEURODES VAPORARIORUM WESTW., ALEURODINEA, HOMOPTERA)

Moscow SEL'SKOKHOZYAYSTVENNAYA BIOLOGIYA in Russian No 2, Feb 85
(manuscript received 6 Mar 84) pp 56-59

ZIL'BERMINTS, I. V., YAKOVLEVA, I. N. and ABRAMOVA, T. L., All-Union Scientific Research Institute of Phytopathology, Bol'shiye Vyazemy, Moscow Oblast

[Abstract] Genetic studies were conducted on the greenhouse whitefly (Trialeurodes vaporariorum) collected in the Moscow region to determine factors responsible for resistance to organophosphorus (carbophos) and organochlorine (Thiodan) insecticides. The whiteflies from the Moscow area were identified as belonging to the American race (arrhenotokous parthenogenesis). Reciprocal crossing studies between resistant and susceptible flies indicated that resistance to each insecticide is basically predicated on one gene which is transmitted by both sexes. In the case of carbophos resistance was clearly a dominant trait, whereas, in the case of Thidan, resistance was manifested in the heterozygotic state as a semidominant trait. In view of the high degree of resistance that was found to prevail over the period of some 40 generations, control of this species will demand the application of more toxic insecticides in various combinations. Figures 1; references 13: 6 Russian, 7 Western.
[1056-12172]

BIOCHEMISTRY

UDC 577.156.1:678.664

INCREASE IN ACTIVITY OF IMMOBILIZED TRYPSIN UNDER INFLUENCE OF ALKALI

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 10, Oct 84 (manuscript received 19 Feb 84) pp 86-88

CHUPRINA, L. N., TSIRKEL', V. A., PKHAKADZE, G. A. and LIPATOVA, T. E., Institute of Organic Chemistry UkSSR Academy of Sciences, Kiev

[Abstract] The possibility is demonstrated of increasing the activity of trypsin, 'rigidly' immobilized on a polyurethane carrier, by exposing it to alkalis of various concentrations, causing both destruction of the polyurethane and hydrolysis of the bonds between enzyme and polymers. Alkali treatment also facilitates study of the extent to which intramolecular bonds of immobilized enzymes are protected from denaturating agents. To exclude possible influence of products of alkaline hydrolysis of trypsin on the determination of activity, as well as influence of alkali residues on hydrolysis of casein in the experiments, the polymer was carefully washed with distilled water after treatment with alkali, until the pH of the wash water was normalized. Determination of the proteolytic activity of the immobilized trypsin in polymers after treatment with alkali solutions of various concentrations showed that its activity for casein was several times greater than the initial activity of the immobilized trypsin before alkali treatment. A polymer carrying immobilized trypsin not only retains but even increases the proteolytic activity after exposure to such strong denaturing agents as concentrated solutions of alkali and high temperature. Immobilization can thus achieve high stability of enzymes, making their use in technological processes quite effective. Figure 1; references: 3 Russian.
[1616-6508]

UDC 576.538:612.67

CELLULAR-KINETIC MODEL FOR STUDY OF GEROPROTECTORS AND GEROPROMOTERS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 278, No 6, Oct 84
(manuscript received 23 Mar 84) pp 1474-1476

CHIRKOVA, Ye. Yu., GOLOVINA, M. E., NADZHARYAN, T. L. and KHOKHLOV, A. N., Scientific Research Institute for Biological Testing of Chemical Compounds, Staraya Kupavna, Moscow Oblast'; Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies have shown that older cells have a lower plateau on th growth curve of diploid fibroblasts. The height of the plateau on the growth curve of any cell can be increased by means of factors which retard the aging of laboratory animals (geroprotectors), decreased by factors which accelerate aging (geropromoters). This work is an attempt to quantify that phenomenon. Experiments were performed on cultivated hamster cells. Exposure to two levels of gamma radiation yielded experimental points relating the number of cells in an experimental flask with the cultivation time. Increasing the radiation dose was found to decrease the initial steepness of the growth curve. It was found that analysis of cultivated cell growth curves can be used to study both geroprotectors and geropromoters. The increase in height of the plateau on the growth curve or increase in initial rate of cell reproduction indicates geroprotector effect. The effect can be expressed quantitatively as a dose of ionizing radiation required to achieve the same effect. Figures 2; references 9: 5 Russian, 4 Western.
[1611-6508]

UDC 612.73:612.744

CYCLICAL NUCLEOTIDES IN MUSCARINIC STIMULATION OF SMOOTH MUSCLES OF SMALL INTESTINE OF GUINEA PIG

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84
(manuscript received 14 Feb 84) pp 738-741

DANILOV, A. F. and PERSHINA, L. I., Institute of Evolutionary Physiology and Biochemistry imeni I. M. Sechenov, USSR Academy of Sciences, Leningrad

[Abstract] A study was made of quantitative changes in c-GMP and c-AMP in the smooth muscles of the small intestine of guinea pigs under the influence of acetylcholine (AC) and carbocholine (CC) agonists. The experiments involved male guinea pigs weighing 350-500 g which were rapidly sacrificed, after which the small intestine was extracted, washed in Kreb's solution at pH 7.4 with 11.0 mM glucose. Extracted muscle strips about 40 mm long were incubated for one hour at 37°C in a thermostated cuvette with Kreb's solution which was periodically changed and continally aerated with carbogen. Accumulation of

c-GMP was observed only in undamaged cells. Attempts to find an increase in the level of c-GMP in homogenates were unsuccessful. A decrease in c-GMP level was observed in homogenates in comparison to the control. The slowness of physiological responses upon muscarinic stimulation of smooth muscles suggests a surprising explanation to the mechanism of neuromuscular transmission by performance of an entire chain of biochemical reactions involving c-GMP. c-GMP can serve as an ion process regulator by phosphorylation of membrane proteins. The data obtained in this study, indicating rapid accumulation of c-GMP with no changes in c-AMP, suggest the important intermediating role of c-GMP in the development of smooth muscle responses, though other paths of regulation cannot be excluded.
[1605-6508]

UDC 577.182.26.088.5:577.322.5:543.422.25

2D-^{1}H-NMR ANALYSIS OF DES(ALA^3-D-VAL^6)-[VAL^1]-GRAMICIDINE CONFORMATION IN SOLUTION. RIGHT-HANDED PARALLEL DOUBLE HELIX

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 11, No 1, Jan 85
(manuscript received 4 May 84) pp 5-20

ARSEN'YEV, A. S., BARSUKOV, I. L., SHEPEL', Ye. N., BYSTROV, V. F. and IVANOV, V. T., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow

[Abstract] Two dimensional NMR-^{1}H spectroscopy was used to determine the conformation of a dimer of des-(Ala^3-D-Val^6)-[Val^1]-gramicidine A analogue in dioxane. The sample was kept for 12 hours at 30°C, when an equilibrium of various forms was obtained with the one studied predominating over the others (>90%). Proton signal analysis was carried out in two stages: first, in accordance with the composition of aminoacids, chemical signal shifts were unambiguously assigned to all aminoacid radicals; then the cross peaks were related between the $C^{\alpha}H$ protons of neighboring aminoacid radicals. The spacial structure of this dimer was obtained from the conformational analysis of nuclear Overhauser effects, spin-spin coupling of vicinal H-N C^{α}-H protons and deuterium exchange rates showing that it is a right-handed parallel double helix with 5-6 radicals per twist ($\uparrow\uparrow\P\P_L{}^5{}_D{}^6$). This type of double spiral was noted for the first time. Structural parameters of this double helix, such as the diameter of axial cavity being about 3 Å and internal hydrophobic surface, corresponded in principle to the requirements placed on gramicidin A transmembrane channel. Figures 12; references 25: 4 Russian, 21 Western (8 by Russian authors).
[1791-7813]

UDC 547.458.22.057

SYNTHESIS OF HEXOSAMINOGLYCAN. MONOMER SYNTHESIS FOR POLYCONDENSATION

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 11, No 1, Jan 85
(manuscript received 6 Jun 84) pp 66-76

BAKINOVSKIY, L. V., TSVETKOV, Yu. Ye., OVCHINNIKOV, M. V., BAYRAMOVA, N. E. and KOCHETKOV, N. K., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] In an attempt to perform a direct comparison of the effectiveness of various monomers containing N-acetyl and N-phthalyl protective groups during synthesis of hexosamine-containing polysaccharides, a synthetic method was developed for model monomers used in preparation of glucoseamine-containing polysaccharide derivatives of a disaccharide 3-O-(2-amino-2-desoxy-β-D-glucopyranosyl)-L-rhamnopyranose: 3-O-(3,4-di-O-acetyl-2-deoxy-6-O-trityl-2-phthalimido-β-D-glucopyranosyl)-4-O-benzyl-1,2-O-(1-cyanoethylidene)-β-L-rhamnopyranose and its corresponding 2-acetamido-2-deoxy derivative, m.p. 132-135°C, $[\alpha]_D$ + 6.4° and 225-228°C, $[\alpha]_D$ -2.6° respectively. References 16: 4 Russian 12 Western (2 by Russian authors).
[1791-7813]

UDC 547.458.057

SYNTHESIS OF HEXOSAMINOGLYCAN. POLYCONDENSATION OF MONOMERS

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 11, No 1, Jan 85
(manuscript received 6 Jun 84) pp 77-82

TSVETKOV, Yu. Ye., BAKINOVSKIY, L. V. and KOCHETKOV, N. K., Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] Study of polycondensation of tritylated cyanoethylidene derivatives of oligosaccharides catalyzed by triphenylmethylium perchlorate could lead to chemical synthesis of regular hexosaminoglycans. Polycondensation of 3-O-(3,4-di-O-acetyl-2-desoxy-6-O-trityl-2-phthalimido-β-D-glucopyranosyl)-4-O-benzyl-1,2-O-(1-cyanoethylidene)-β-L-rhamnopyranose (I) and its corresponding 2-acetamido-2-desoxy analogue (II), described in preceding paper, was studied under conditions analogous to the synthesis of polysaccharides from neutral sugars: in CH_2Cl_2 at room temperature, in the presence of 0.1 g-equivalent of triphenylmethylium perchlorate as a catalyst. This polycondensation of I gave a high yield of regio- and stereoregular polysaccharide consisting of 40-45 repeating disaccharide segments. With II, no such results were obtained; evidently the acetamide group inhibited the polycondensation by possible bonding of the catalyst, resulting in a formation of only 4-5 units containing oligomers. References 10: 7 Russian (1 by Western authors, 3 Western (2 by Russian authors).
[1791-7813]

UDC 547.458'118'915.5.057:579.842.14:577.124.5

SYNTHESIS OF MORAPRENYLPYROPHOSPHATE DISACCHARIDES--PRECURSORS IN BIOSYNTHESIS OF SALMONELLA O-ANTIGENIC POLYSACCHARIDES OF C_2 AND C_3 SEROTYPES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 11, No 1, Jan 85
(manuscript received 15 Jun 84) pp 83-90

TORGOV, V. I., PANOSYAN, K. A., SMELYANSKIY, A. T. and SHIBAYEV, V. N.,
Institute of Organic Chemistry imeni N. D. Zelinskiy, USSR Academy of Sciences, Moscow

[Abstract] The goal of this work was to synthesize moraprenylpyrophosphate disaccharide Man(α1-3)Gal(α)PPMpr (I)--the intermediate compounds for the assembly of a polysaccharide link--and its isomer Man(β1-3)Gal(α)PPMpr (II) in order to study the specificity of action of mannosyltransferase. In the first stage the disaccharides Man(α1-3)Gal, Man(β1-3)Gal and their acetates were synthesized and converted to α-glycosylphosphates (III) by the MacDonald reaction. Treatment of III with moraprenylphosphoimidazolidate yielded corresponding morpaprenylpyrophosphate disaccharides (I and II). These compounds were stable when stored in methanol solutions containing ammonium acetate. References 12: 4 Russian, 8 Western (3 by Russian authors).
[1791-7813]

UDC 547.388'963.4.057

SYNTHESIS AND PROPERTIES OF RETINYLIDENEPEPTIDES CONTAINING ASPARTIC ACID RESIDUE

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 11, No 1, Jan 85
(manuscript received 18 Jun 84) pp 98-107

KARNAUKHOVA, Ye. N., MITSNER, B. I., ZVONKOVA, Ye. N. and YEVSTIGNEYEVA, R. P.,
Moscow Institute of Fine Chemical Technology imeni M. V. Lomonosov

[Abstract] An attempt was made to determine the effect of an aspartic acid radical on protonation of the aldiminic bond of retinol. Analysis of molecular models led to an assumption that the β-carboxylic group of the aspartic acid residue could protonate this bond intramolecularly. To test this assumption, a series of retinylidene peptides was synthesized consisting of 2-10 amino acid chains, one or two of which were aspartic acid radicals. The physical-chemical properties of these compounds were studied indicating that the β-carboxyl group of aspartic acid radical could possibly affect the formation of an intramolecular protonation of this bond. Figures 4; references 13: 5 Russian, 8 Western (1 by Russian authors).
[1791-7813]

UDC 547.475.02:541.63

STEREOCHEMISTRY OF TRIHYDROXYOCTADECADIENOIC ACIDS FROM BRYONIA

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 11, No 1, Jan 85
(manuscript received 1 Dec 83; after final revision, 20 Jun 84) pp 126-131

PANOSYAN, A. G., Institute of Fine Organic Chemistry, ArmSSR Academy of Sciences, Yerevan

[Abstract] An optically active fraction of trihydroxyoctadecadienic acid (THODA) was isolated earlier, capable of intensifying the smooth muscle tonus analogously to prostaglandins. The goal of this work was to study the stereochemistry of the components of THODA. The stereoisomers of methyl esters of THODA obtained from the roots of Bryonia alba L. were isolated by chromatography on silica gel using complexones. On the basis of gas chromatography and mass spectrometry data of trimethylsilyl derivatives of the subfractions obtained along with the data of gas chromatographic analysis of the oxidative ozonolysis products of (-)-methoxycarbonyl derivatives of the obtained compounds, conclusions were reached concerning the stereochemistry and formation routes of the components of α-linoleic acid mixture. In all probability, formation of THODA occurs as a result of initial oxidation of ω3-, ω6-, ω7- and ω10 carbon atoms followed by further nonenzymatic conversion of these peroxides. References 23: 4 Russian, 19 Western (1 by Russian authors). [1791-7813]

UDC 577.254.2

LIGHT SCATTERING STUDY OF RHODOPSIN PHOSPHORYLATION EFFECT ON ITS INTERACTION WITH TRANSDUCIN

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 2, No 1, Jan 85
(manuscript received 26 Jul 84) pp 5-10

ARSHAVSKIY, V. Yu., DIZHUR, A. M., KAULEN, A. D., SHESTAKOVA, I. K. and FILIPPOV, P. P., Moscow State University imeni M. V. Lomonosov; Interdepartmental Scientific Problems Research Laboratory of Molecular Biology and Bioorganic Chemistry imeni A. N. Belozerskiy

[Abstract] The effect of rhodopsin phosphorylation on its interaction with transducin was studied by the method of light scattering; also an attempt was made to determine whether the light scattering of photoreceptive membranes changed in any way during their interaction with transducin in darkness, when a "dark" complex of membrane-transducin was formed. The results showed that after phosphorylation, rhodopsin does not lose its ability to bind transducin in light; the complex being formed can dissociate. Under conditions of poor lighting, the ability of phosphorylated rhodopsin to activate transducin is

depressed. The binding of transducin to photoreceptor membranes in darkness is accompanied by increased light scattering in the suspension of these membranes. In general, current results were in agreement with earlier data showing that the ability of phosphorylated rhodopsin to activate light sensitive phosphodiesterase reaction is inhibited. Figures 6; references 9: 3 Russian, 6 Western (1 by Russian authors).
[1792-7813]

BIOPHYSICS

PROTEIN RESEARCH INSTITUTE AT ACADEMY OF SCIENCES

Tbilisi ZARYA VOSTOKA in Russian 15 Mar 85 p 4

TSERETELI, V.

[Abstract] The article is an interview with Doctor of Physical-Mathematical Sciences, Professor Petr Leonidovich Privalov, head of the thermodynamics laboratory of the USSR Academy of Sciences' Protein Scientific Research Institute. Privalov is a USSR State Prize laureate and was recently elected a corresponding member of the USSR Academy of Sciences. He is credited with designing a scanning microcalorimeter, which has earned international recognition.

In the interview, Privalov traces his career. He enrolled in the school of physics of Tbilisi State University in 1951 and subsequently became the first postgraduate student in the field of biophysics at the Georgian Academy of Sciences' Institute of Physics. He remained at this institute as a staff member and defended a candidate dissertation there on the topic of structural stability of proteins. He was recruited to work at the protein research institute when it was organized in Pushchino in 1966. Privalov mentions that Aleksandr Sergeyevich Spirin has headed this institute since its founding. The institute has a research staff of 50 at the present time.

FTD/SNAP
CSO: 1840/304E

UDC 57:531.577.3

BIOCHEMICAL PRINCIPLES OF THERMOISOLATION OF HOMOIOTHERMS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84
(manuscript received 17 Oct 83) pp 728-731

OBRAZTSOV, I. F., academician, KHANIN, M. A. and BAT', O. G., Institute of Atomic Energy imeni I. V. Kurchatov, Moscow

[Abstract] The purpose of this work was to study the biomechanical specifics of thermal insultation of homoiotherms by mathematical modeling. The model was based on the principle of energetic optimality $W_T + W_M + W_r = \min$, where W_T is the power consumed by an individual to maintain body temperature outside the thermoneutral zone, W_M is the additional power expended for transfer of the thermally insulating layer as the individual moves, W_r is the power consumed in restoring the thermal insulating layer. It was found that homoiotherm species can be divided into two troups. In the first group, the lower boundary of the thermally neutral zone is higher than the mean winter temperature of the environment in which they live, while in the second group these values coincide. Equations are presented for determining whether a specific species belongs to group one or group two. The mathematical model agrees well with experimental data. Figures 2, references 6: 1 Russian, 5 Western. [1605-6508]

UDC 577.352.465

γ-AMINOBUTYRIC ACID (GABA) RECEPTOR FROM RAT'S BRAIN IN PLANAR PHOSPHOLIPID MEMBRANE

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 2, No 1, Jan 85
(manuscript received 27 Jul 84) pp 11-16

KOLOMYTKIN, O. V., ABDRASILOV, B. S. and KUZNETSOV, V. I., Institute of Biological Physics, USSR Academy of Sciences, Pushchino, Moscow Oblast

[Abstract] The goal of this study was to evaluate the possibility of using the Schindler method for incorporation of GABA receptor into a planar biomolecular lipid membrane (BLM) without a solvent. The results obtained showed that the model membrane, into which a preparation from rat brain synaptic membranes enriched with GABA binding fragments were incorporated, is specifically chemosensitive to GABA. Ionic channels opened in the membrane after addition of 10^{-6} M GABA to the solution. Other neuromediators studied showed no effect on membrane conductivity. Two types of GABA sensitive channels were noted: anion and cation selective channels with a lifetime of about 20 ms and electron conductivity of 130 ± 50 pS (0.2 M/2 M KCl). Addition of an inhibitor of chloride channel in the native GABA receptor--picrotoxin--to above treated

membrane diministhed its integral conductivity by 30-60%. Analysis of the results obtained in native and model membranes showed that the electric properties of the ionic channels are similar in both types of membranes. Hence it was concluded that functioning synaptic receptors of GABA were incorporated into planar BLM. Figures 3; references 14: 2 Russian, 12 Western.
[1792-7813]

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INVESTIGATION OF ELECTRIC BREAKTHROUGH OF CELLULAR MEMBRANES BY PATCH-CLAMP METHOD

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 2, No 1, Jan 85
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[Abstract] Disturbance of the barrier function of biomembranes by an electric field, the so-called electric breakthrough, may be used for cell loading with substances normally incapable of penetrating the membrane, for easier transformation of cells in the presence of exogenic DNA, etc. Electric breakdown of the membrane in neighboring cells leads to their fusion and may be considered as a promising method of somatic hybridization. The goal of the present work was to study this phenomenon in comparison with breakdown of artificial bilayers using the patch-clamp method. Application of perpendicular voltage pulse led to irreversible membrane damage preceded by a stage of reversible increase in its conductance. Depending on the applied voltage, the time required to reach this irreversible step varied. The development of the breakdown followed a similar pattern in a wide range of voltages and pulse duration. The return of this membrane to the original low conductivity state occurs in two steps. The breakdown of cellular membranes was similar to that of the artificial ones suggesting that both occurred principally in the lipid matrix of these membranes. Figures 6; references 25: 3 Russian 22 Western (3 by Russian authors).
[1792-7813]

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LONG-LASTING DEFECTS IN LIPID BILAYER AFTER REVERSIBLE BREAKTHROUGH

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 2, No 1, Jan 85
(manuscript received 6 Jul 84) pp 87-94

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[Abstract] Time required to reseal the pores induced by reversible electric breakthrough was studied on UO_2^{++} modified bilayer lipid membrane using voltage clamp and charge pulse relaxation technique. It was shown that the characteristic time of bilayer reconstitution (pore healing) lasted at least one and up to 100 seconds--an equivalent time to that observed in cellular membranes. These data supported the hypothesis that electric breakthrough of biomembranes is connected with pore generation in their lipid matrix.
Figures 7; references 19: 4 Russian, 15 Western (2 by Russian authors).
[1792-7813]

BIOTECHNOLOGY

BIOTECHNOLOGICAL DEVELOPMENTS

Moscow KRASNAYA ZVEZDA in Russian 23 Mar 85 p 4

[Interview with Genrikh Romanovich Ivanitskiy, corresponding member of the USSR Academy of Sciences, director of the Institute of Biological Physics, USSR Academy of Sciences, recipient of the Lenin and USSR State prizes: "Patents of Living Nature"]

[Excerpts] Efforts are being made to develop a computer on a biological basis, i.e., a device that makes use of elements inherent in the nervous system. It is planned to equip it with "biological" sensors and actuating devices also based on so-called molecular mechanisms of muscular contraction.

Biological elements can also be used as memories. This was shown by investigations of bacteriorhodopsin, a substance that resembles rhodopsin (visual purple), which is the main visual pigment of the retina of the eye. After scientists discovered bacteriorhodopsin in the cell membranes of some bacteria, it was established that, when dehydrated, it can stop at a certain stage of the photochemical cycle retaining the image recorded on it. And there was another important finding: Upon interaction with a quantum of light, the color of the bacteriorhodopsin molecules changes. That is when a bold idea occurred: why not use the film from bacteriorhodopsin as microelements in the optical memory of computers. The text of several tens of thousands of books could be recorded on a disk made of such biological material the size of an ordinary long-playing record!

It is not by chance that interest arose in biological microdevices. The fact of the matter is that the sources of biological materials are cheap, they can be recovered in virtually unlimited quantities using methods of continuous cultivation of microorganisms and animal cells.

Biological devices are characterized by a wide spectrum of transformed forms of energy--chemical, mechanical, photic, electric and, in a number of instances, there can be reversibility of transformation processes, one can use the same sensors in different systems to solve different problems.

Thanks to the advances in biophysics (in the second half of the 20th century a new term also appeared--bioengineering), people learned much about how

information is stored and transmitted in living cells, how molecules and ions move, how proteins are synthesized and how energy is stored in living cells.

Nature is a great creator. Biological systems differ from existing engineering ones in their high level of miniaturization, high concentrations of energy, low coefficient of friction and, as we have already stated, high reliability.

Let us consider the molecule of pepsin, which is one of the most important protein enzymes involved in digestion. Figuratively speaking, it specializes in "biting through" protein molecules. This is a rather important function. Yet it is performed, it can be said, without loss of energy, with an efficiency that virtually equals one! What if such a molecule were built into some device?

Microengineering, which is being developed on the basis of biological "patents" from biological materials, is taking its first steps, but there would be nothing surprising if it would become just as popular an element of control of technological and research processes as engineering devices became in our time within 10-15-20 years.

We have cited only a few examples of current applied biophysical studies, but even they apparently give an idea of the great potential of biophysics in solving the most important applied problems and how broad the range of its interests are.

Glancing into the future, we can mention one important document, "Forecast of Development of Biological Physics." It contains the formulation and validation of solutions of more than 90 applied problems. We shall not list them all, but only the four global scientific problems, within the limits of which they are contained. We refer, first, to development of methods of monitoring changes in man's environment; second, further development of preventive medicine, diagnostics, maintaining and restoring our health; third, the search for means of supplying food for man; fourth, determination of variations of optimum use of the diminishing stock of mineral resources.

10,657
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SOME PROBLEMS IN MICROBIOLOGICAL PRODUCTION OF FOOD AND FEED PRODUCTS

Yerevan BIOLOGICHESKIY ZHURNAL ARMENII in Russian No 10, Oct 84 (manuscript received 14 Mar 84) pp 825-836

[Article by E.K. Afrikyan, Institute of Microbiology of the Armenian SSR Academy of Sciences]

[Text] The current state of microbiological production of food and feed products is reviewed. Based on local resources and conditions, some approaches to the solution of this problem in Armenia are presented.

Key words: microbial feed and food products, microbial protein.

Successes in the field of microbiology, which, to a significant degree, have determined current accomplishments in biotechnology, have uncovered new prospects for higher economic and industrial production of feed and food products, the effective solution to pressing problems in bioenergetics, the intensification of technological processes in many areas of manufacturing and the organization of wasteless production. In the USSR, large-scale production of feed protein, microbiological substances for the protection of plants, enzymes and many other biologically active substances has been organized and successfully developed. Considering the importance of this type of production for the realization of the Food Program, microbiological manufacturing is included in the agro-manufacturing complex.

Approximately one quarter of the population on our planet, mainly in underdeveloped countries, suffer from an insufficiency of food. According to official data [8], in order to guarantee the growth of a population to the year 2000 of up to 7 billion people, the production of food products must be increased by a factor of 1.7, and correspondingly, in order to meet the requirements, the processing of grain and feed products for animal husbandry must increase by a factor of 2.5. In recent years, to compensate for the increasing deficits in food and feed products, in particular protein, the utilization of microbiological methods has taken on exceptional importance.

The utilization of microorganisms for production of feed and food products encompasses a wide circle of problems related to microbiological production of proteins, fats, carbohydrates, vitamins and other food substances. In fact, this field of knowledge dates back to antiquity and is related to the

processing of bread and sour-milk products as well as various fermentative productions now in existence.

Achievements in the fields of microbiology and technology for microbiological production have ensured the development of new directions in industrial utilization of microorganisms for production of food and feed products. At the present time, in many countries, large-scale production has also been created for the so-called single-cell protein, representing the biomass of a culture for various microorganisms.

In our country, the scientific bases for microbiological production of single-cell proteins in hydrocarbons has been developed, the largest industrial production of it has been organized, and a wide-scale complex of medico-biological experiments has been carried out on yeast protein-vitamin concentrate in liquid paraffins [5].

The creation and development of large-scale microbiological production of single-cell proteins for food and feed purposes signifies a new stage in the development of science and industry with great socio-economic consequences. Achievements in this area help solve the problem of production of food and feed products in the most economical industrial way on a non-agricultural basis. The possibilities for utilization of the practically inexhaustible renewable resources of wood-cellulose and starch raw materials uncover inorganic prospects for the development of this field of manufacturing.

The technology for production and conservation of traditional food and feed products, as a rule, include predefined microbiological processes.

Given this, it is essential that processing of the initial product occurs to increase its nutrient value and accumulate in it new substances of higher assimilability. Among the methods used for preservation and long-term conservation of food products, with the exception of desiccation, curing and sterilization, the practice of salting and lactic fermentation was widely used to ensure good preservation of products with an increase in their nutrient value. The addition to fresh vegetables of 2-2.5 percent cooking salt stimulates anaerobic lactic fermentation and the growth of halophytic yeasts which ensure in seafood products a significantly greater content of proteins and vitamins. The production of raw materials is, perhaps, the best example of intelligent utilization of microorganisms for the purposes of conservation and enrichment of milk products with more assimilable nutrient compounds. A good illustration of the above are various sour-milk products (yogurt, sour milk, koumiss and others), which have been used by different nations for centuries and which possess not only a higher food value than milk but also possess definite therapeutic-prophylactic propertes.

As a result of multi-year studies, L.A. Yerzinkyan and his colleagues at the Institute for Microbiology of the Armenian SSR Academy of Sciences isolated and studied in depth cultures of lactic acid bacteria which possess valuable therapeutic-dietetic properties [4]. In our republic and in many regions of our country, the milk called "Narine" has been very popular. It is a substance developed with the application of specific cultures of lactic acid

bacteria and has therapeutic-prophylactic effects for intestinal disorders which particularly affect children.

In various areas of the yeast industry, the fermentative activity of microorganisms for processing and enrichment of plant products with aminoacids, proteins and vitamins has been widely used. In a number of countries, in particular those with hot climates, beer has been made from corn and sorghum with the utilization of the starch-hydrolyzing fungi Amylomyces rouxii and the yeasts Endomycopsis burtonii, by which an end-product is obtained with an alcohol content of up to 8 percent and which is not filtered to avoid loss of nutrient substances from the drink. In Japan, soy sauce and soy paste (mizo) are food products which are widely used. Fermentative processing is carried out with the use of leavening from Aspergillus soyae and A. oryzae, cultivated from the cuttings of rice and millet. After fermentative hydrolysis in a substrate, salt and leavening from halophylic yeasts Saccharomyces rouxii and lactic acid bacteria, cultivated in cooking salt in an amount of up to 14 percent, are added. The most common national dish in Japan is natto, which consists of beans (soy beans, kidney beans, broad beans and others), liberally infected with cultures of spore-forming bacteria from the group of senna bacillus (Bac. natto). The above-mentioned forms of microorganisms possess a wide spectrum of fermentative activity on the basis of which hydrolysis of large-molecular compounds is accomplished--proteins, starches, lipids and more assimilable forms which ensure a higher nutritious end product.

The processes of silaging and fermentation of fodder result in microbiological and fermentative processing with enrichment of proteins, vitamins and other more assimilable compounds.

In recent years, great successes have been attained in the field of microbiological processing of plant raw materials for production of food and feed proteins and other compounds.

Paramount significance, in this regard, has been assigned to ligno-cellulose raw materials, the renewable resources of which are enormous and of which our planet consists of approximately 10-15 tons per year per person. A number of active producers of cellulose have been isolated and studied in detail. By the method of genetic engineering, prospective recombinant-producers have been created, including those from yeast organisms [2]. In a number of countries, using cellulolytic microorganisms, production has been set up for glucose and glucose-fructose syrups, as well as yeast biomass with food and feed significance. In this field, unsolved problems still exist: the development of optimal and economic conditions for the pre-processing of cellulose raw materials, production of active producers of acid and thermophylic cellulase, thermophylic yeasts and fungi with food significance, and so forth.

There must be more significant and complete recognition of the problem of enrichment and production of food and feed protein in starch raw material. Highly productive strains of starch-hydrolyzing organisms with a high yield of nutrient biomass have been isolated and studied in depth. A number of manufacturing firms have developed, by using model microorganisms, primarily

fungi and yeasts, an effective technology for production of feed protein and enriched starch products, for example, potatoes and kasha. With the application of model strains, it became possible to increase the content of protein in these starch-containing products 4-5 fold. At the same time, unresolved important questions remain regarding the economic character and above all, the net cost of manufactured feed and food protein.

Perhaps, in this regard, the developments in the area of so-called solid-phase fermentation have the greatest importance [3,7]. Its advantage lies in the fact that this technology is sufficiently simple, not power-consumptive and can be set up in conditions of small-scale farming. The process of cultivating microorganisms and accumulating feed protein for conversion of cellulose and starch raw materials can be accomplished in non-sterile conditions and in a single stage. The effective technology for solid-phase fermentation was developed in France (OPSTOM, INRA [expansions unknown]). In fact, these processes for solid-phase fermentation traditionally date back to practices used in Japan and several other countries in Southeast Asia in the technology of microbiological processing and conservation of feed and food products.

According to technology developed in France for solid-phase fermentation, dried plant substrate (kasha, potato, banana) is first treated in a fermenting vapor for a period of 10 min at 75°. After cooling, the mass is mixed with water at a level of up to 60 percent of the total humidity, during which the added water should contain sources of nitrogen for the microorganism (urea, ammonium sulphate), mineral salts and 20 million spore per gram of dry substrate of mycelium amylolytic fungi (Aspergillus hennebergii). With weak mixing, the inoculated substrate spontaneously takes on a granular form with a particle dimension of 1-2 mm, through which the moistened air freely penetrates. The temperature is automatically controlled by noncontinuous aeration, mechanical mixing and spraying of water, used also for regulation of pH and humidity. Incubation occurs in the course of 24 hours at 36-40°, after which the end product contains, on the average, 20 percent of the actual protein and 25 percent of the remaining sugars.

Solid-phase fermentation is of great manufacturing interest for the enrichment of protein from plant substrates, and is being conducted in France by the firm of Speykh which has set a course for the realization of this biotechnology on a large industrial scale.

The technical-economic effectiveness of solid-phase fermentation is evident. Given a yield of potatoes (or kasha and bananas) in 40 t/ha, it allows enrichment of the initial product with up to 20 percent more protein and results in production from one hectare of 1.7 t of raw protein, that is, almost 3 times more than the yield from cultivation of soy. The indisputable advantage of solid-phase fermentation is its non-wastefulness.

Fungi and yeasts are of paramount significance for microbiological enrichment of protein in starch raw material. Among hydrolyzing starches, the most important yeasts are the genus Lipomyces, in particular, L. kononenkoae, studied in detail in Portugal by N. Van Uden and his colleagues. The yield of

the yeast biomass of this form, given cultivation in starch, is 50-60 percent and exceeds 5-10 fold the yield from the use of cultures of Candida, Hanseniaspora and other yeasts (table 1).

Таблица 1

Выход биомассы дрожжей на крахмале (в г конечной биомассы/г внесенного крахмала)

(1) Род, вид	(2) Количество видов / (3) штаммов	(4) Биомасса, г
Bullera alba	1	0,11
Candida	11 11	0,07–0,37
Cryptococcus	9 9	0,09–0,24
Debaryomyces	6 6	0,13–0,34
Endomycopsis fibuligera	3	0,05–0,06
E. pilatypodis	1	0,16
Hansenula	4 5	0,04–0,35
Lipomyces anomalus	1	0,1
L. kononenkoae	2	0,38–0,39
L. lipofer	4	0,34–0,39
L. starkeyi	6	0,43–0,55
L. tetrasporus	12	0,37–0,45
Nematospora coryli	1	0,06
Pichia	4 4	0,05–0,29
Saccharomyces	2 2	0,07
Schwanniomyces	1	0,37
Torulopsis	5 5	0,04–0,34
Trichosporon	5 5	0,05–0,39
Wingea robertsii	1	0,27

Table 1. Yield of yeast biomass in starch (in grams of final biomass per grams of introduced starch)

Key:

1. Genus, species
2. Quantity of species
3. Strains
4. Biomass, grams

As a result of collaborative studies of our institute and Portuguese scientists, prospective data have been obtained in the field of bioconservation of starch and starch raw materials in yeast protein [1]. With the use of highly productive strains of starch-assimilating yeasts at the Institute of Microbiology, the conditions for cultivation of these yeasts in starch were studied in depth and test batches of their biomass were produced. Conducted under the direction of S.K. Karapetyan, a three-year experiment revealed the high feed value of these products in poultry farming. Utilization of them in the food ration of chicks and hens, in exchange for standard feed yeasts, increased animal weight gain (table 2), productivity and quality of eggs.

Таблица 2

Динамика привесов цыплят при вскармливании их биомассой L. kononenkoae шт. 5608

(1) Варианты	(2) 60 дней				Сохранность поголовья, % (7)
	курочки (3)	петушки (4)	средняя, вес (5)	привес, % (6)	
Рацион + 2,85% кормовых дрожжей (контроль) (8)	704	829	766	100	92
Р + 1,5% опытной биомассы (9)	672	792	732	94	95
Р + 2,5% опытной биомассы (9)	717	888	777	102	98
Р + 3,5% опытной биомассы (9)	739	883	811	107	94

Table 2. Dynamics of weight gain of chicks as a result of feeding them with biomass of L. kononenkoae strain 5608.

Key:

1. Variants
2. 60 days
3. Hens
4. Cockerels
5. Average weight
6. Weight gain, percent
7. Preservation of stock, percent
8. Food ration + 2.85 percent of feed yeasts (control)
9. Test biomass

Yeast organisms occupy a leading place among the microorganisms, used for the purposes of enrichment of protein from plant raw materials and production of single-cell protein.

Compared to other groups of microorganisms, yeasts have a lower content of raw material protein, however, based on their aminoacid composition, they have a number of advantages. Of importance is their low, in comparison with bacterial organisms, content of nucleic acids, in particular, RNA. It is crucial to note that the content of protein in yeasts, cultivated in starch, is characterized by high indices for a constituent of non-interchangeable aminoacid. Yeasts contain many valuable carbohydrates. In specific conditions of cultivation, they have a high lipid-forming capacity, and in a separate group the content of fat reaches up to 50-60 percent of the total biomass. Of no less value is their high biosynthetic capacity for the formation of vitamins of group B. The above-stated shows the high feed and food features of yeast biomass given their cultivation in different substrates, in particular in cellulose and starch wastes, as well as in hydrocarbons.

To produce a yeast protein-vitamin concentrate (biomass) in hydrocarbons, cultures of Candida tropicalis, C. lipolytica, C. maltosa, Lodderomyces elongisporus, Pichia and various other forms are used. More diverse are the content of yeasts, used for production of yeast protein in carbohydrates in sub-surface conditions of fermentation in liquid media. However, the most preferable ones are Candida utilis, C. tropicalis, C. scottii, Endomycopsis filubiger, and Kluyveromyces fragilis.

The basic complication in industrial production of yeast, as well as to a

certain degree in fungi biomass production, is the need to remove heat during the process of fermentation. Of significance in this regard, is the search for thermotolerant yeasts, in particular from the genus Rhodotorula, which are characterized by temperature parameters for growth in the ranges of 28-35°, by a highly intense rate of multiplication (a period of duration of 2-2.5 hours), and by the capacity to develop in a pH of 3.5-5.0. The search for thermoresistant forms revealed that fungi were relatively more promising, in particular several forms of Sporotrichum and Paecilomyces.

In recent years, an increased interest has been noted in wide-scale use of fungi organisms both for processing of plant wastes and enrichment of them with protein, and for production of biomass for feed and food purposes. In many countries, production of higher fungi on an industrial basis has been well organized. In recent years, great successes have been attained in cultivation of these organisms in sterile cultures in liquid nutrient media by the method of sub-surface fermentation.

Several cultures of fungi, including incomplete forms, now have industrial application in a number of countries. Using the thermostable strain of Chaetomium cellulolyticum--an active producer of cellulase--a process for production of a single-cell protein (the Waterloo process) was developed in Canada. In Finland, cultures of Paecilomyces varioti are used for this purpose in sulfite drains. To produce a feed biomass from cellulose wastes, strains of Trichoderma viride, T. reesii and related forms are used and to produce them from starch raw materials, Asp. fumigatus, Rhizopus ligosporus and several others are used. Use of hybrid organisms should be preceded by a multisided study to prevent the formation of mycotoxins.

Along with the above-mentioned groups, there has been a tendency to expand use of other forms of microorganisms, especially bacteria and mycobacteria. Of special interest are the prospects for the practical application of extremal forms of microorganisms, primarily thermophils, acidophils and halophils, the utilization of which ensures in nonsterile conditions directed processes for the treatment of various substrates.

In the field of microbiological production of single-cell protein, an indigenous break in what was frequently called non-traditional, and the corresponding non-traditional food and feed products was noted 20 years ago after the establishment of the possibility of industrial processing of yeast in hydrocarbons. In the USSR, large scientific-industrial plants were established, as a result of which in our country, an industry was created which manufactured in hydrocarbons approximately a million tons of yeast biomass each year. Processing of this product in normal paraffins was organized in other countries as well, however, in several of them, large-scale production output was not put into use. The oil crisis which occurred in 1973 and the rise in the price of oil had a negative influence on the development of this field of manufacturing. Owners of soybean markets played an essential role in blocking production of microbial protein, creating in print a negative public opinion on this question. Recently, the decrease in the price of oil and the simultaneous increase in the price of soy flour have given yeast protein a competitive capacity with plant production.

Great successes have been attained in production of microbial protein from methanol. For these purposes, strains of methylotrophic bacteria Methylophilus methylotrophus (England) and Methylomonas clara (FRG) have been used. An exceptionally important achievement in genetic engineering for this field was the cloning of glutamic acid dehydrogenase from intestinal bacteria in the produced strain of methylotrophic bacteria [9]. It is necessary to stress that the biomass of methylotrophic bacteria has been thoroughly studied and the complete possibility for its utilization in the capacity of both feed as well as food products has been demonstrated. For this purpose, one must conclude that the limiting factor for development of microbial protein production in hydocarbons, methanol and other raw material sources are, basically, economic problems. An important condition for decreasing the net cost of the product is large-capacity production and the creation of large-scale factories with progressive technology.

Of enormous interest for production of feed and food products, and of equal importance for production of biotite and organic fertilizers is microalgae. These single-cell organisms are extremely rich in protein and vitamins, are characterized by a highly intensive rate of growth, and develop in simple conditions given the presence of sun light and carbon dioxide.

Given optimal conditions for cultivation of microalgae in uncovered ground, the output of their biomass amounts to 15-30 g/cm^2 per day, and sometimes up to 40-45 g. Per hectare of ground, the output of their biomass reaches up to 60-70 tons per year, and the quantity of conversion per produced protein (content of 55-65 percent) exceeds by almost 50-100 fold the productivity for protein with a similar territory of soy and wheat cultivation.

In recent years, a tendency has been noted for wide-scale utilization of microalgae of the genus Spirulina, Coelastrum, and Scenedesmus instead of chlorella, the protein of which is poorly utilized due to the dense casing of the cells. Of greatest interest is Spirulina, which has been widely utilized since antiquity as a food product by populations of various countries in Africa and Latin American [6,10]. The advantage of this microalgae is the fact that, because of its relatively large size, it can be extracted by simple filtration without the ordinary labor-intensive processes of separation of the microbial biomass. Given this, the assimilability of the protein biomass is 80-90 percent.

In many countries, large-scale projects have been implemented for the organization of large-capacity production of feed and food products from microalgae. At the same time, it is recognized that the cultivation of microalgae is the most effective and promising way to manage the desert and unused lands, especially in countries with hot climates. Utilization of photosynthesizing bacteria and microalgae for the purification of sewage water with simultaneous production of biomass in fodder and organic fertilizer has acquired special practical interest. In a number of countries with high solar radiation, large-scale industrial plants have been created for these purposes, the use of which has shown a high technical-economic effect.

Prospects for utilization of nitrogen-fixing photosynthesizing microorganisms, in particular, highly productive nitrogen-fixing mutants of phototrophs, which do not shed nitrogenase activity in complex-organic media, are exceptionally important. In this field, we find ourselves, evidently, on the threshold of revolutionary discoveries, made possible with the aid of genetic engineering methods.

It is impossible to ignore the many promising directions in the field of studying the association of Azolla--Anabaena; a highly active system of fixation of molecular nitrogen because of the specific symbiosis of plants and Cyanophyceae. The interest in this field is completely justified in relation to the possibilities for development of higher plants, including Gramineae, which have nitrogen-fixing activity.

Balanced according to aminoacids, primarily lysine, fodder ensures a significant increase in the productivity of animal husbandry with an increase in weight gain of up to 15 percent and a sizeable economy of feed components. In our country, large-scale production of fodder lysine has been organized, the wide-scale practical use of which should be implementation in the most effective and rational way. In this regard, a large and very useful experiment was completed in Latvia. Of special practical interest, are data on the use in combined fodder manufacture of various concentrates of lysine manufacture (ZhKL [fatty acid lysine], KKL [expansion unknown]) as well as wastes (aminobacterin, biomass and others). In collaboration with the Ministry of Procurement of the Armenian SSR, the Institute of Microbiology has developed recommendations for the technology to introduce into combined fodder, fat products from lysine, processed at the Charentsavan plant of the ASSR Production Association, "Lysine." Realization in the republic of these proposals for combined fodder manufacture ensures the reduction of net cost of fodder by not less than 4 million rubles per year with a significant economy in expenditure of grain and the production of an additional weight gain in animals constituting not less than 8 percent. There is a large amount of work to be done for the creation in combined feed factories of installations for reception, dosing and introduction in combined feed of lysine products in relationship to elaborated projected-technological documentation.

At the present time, along with aminoacids, microbiological manufacture has developed a wide assortment of feed antibiotics, vitamins, hormones and other biostimulators, the numbers of which are all increasing [5].

In our republic, there are required prerequisites for implementation of a wide-scale complex of scientific-industrial work in promising areas of microbiological production of protein-vitamin products for food and feed purposes.

In accordance with the resolution of the CPSU Central Committee of Armenia and the Council of Ministers of Armenian SSR taken on July 24, 1964, large-scale work has been conducted in the republic for the creation and development of microbiological manufacturing and the complex of scientific investigation in this area. The Charentsavan plant for lysine and the Abovyan plant for

biochemical preparations have been created and are functioning. The Armenian affiliate of the All-Union Scientific Research Institute of Genetics has been organized, on the basis of which the All-Union Scientific Research Institute of Technology for Aminoacids was recently formed. In the city of Abovyan, a large-scale scientific-industrial complex was created under the auspices of the Institute of Microbiology of the Armenian SSR Academy of Sciences. Studies have been significantly expanded in the area of general and applied microbiology in many other scientific establishments throughout the republic.

There is no doubt that the wide-scale use of modern achievements in microbiology and biotechnology can, to a significant degree, ensure the solution to feed and food problems in Armenia SSR.

Above all, it is necessary to underscore the prospects for organization in Armenia of production of feed protein and protein-vitamin products on the basis of photosynthesizing microrganisms.

In the 1977 resolutions of the Council of Ministers of the Armenian SSR, the creation in the republic of installations for cultivation of chlorella for feed purposes was considered. Exploitation of similar installations in the Nairiyskiy animal husbandry complex showed good results. The compiled results from a study in our country (Central Asia) attested to the high feed value of chlorella and other microalgae. Unfortunately, in our republic, work with more promising forms of microalgae and their wide-scale introduction into production have not been conducted. Moreover, in Armenia the required scientific-production bases for the study of many phototrophic microorganisms already exist (Institute of Hydroponics and Agrochemical Problems, Institute of Microbiology of the Armenian SSR Academy of Sciences).

The Institute of Microbiology of the Armenian SSR Academy of Sciences has developed and created installations for the cultivation of promising microalgae and phototrophic bacteria in sealed systems. Extremely encouraging results were obtained (M.N. Malatyan) for cultivation of photosynthesizing bacteria in carbonate mineral waters, which allows significant intensification and decreased cost of the process of cultivation of these organisms.

As a result of studies conducted by S.K. Karapetyan and his co-workers, effective utilization of a biomass of phototrophic bacteria in poultry farming was established using doses of 0.1-1 percent in exchange for this quantity of feed yeasts: the egg production of chickens increased by 8.6 percent, the outlay of feed per kg of egg mass was decreased by 17 percent, the content of carotin in the yolk was doubled, and the period of egg productivity was extended.

In the conditions which exist in Armenia, with an exceptionally large amount of sunny days per year, it is extremely promising to consider the creation of installations for the cultivation of photosynthesizing microorganisms, primarily in Spirulina, in carbonate mineral sources as well as in the salt marshes in the Ararat plain.

It is useful to note that 50 years ago, design-technical documentation

was developed for construction in Armenia of a plant for the production of feed yeasts from raw materials on the basis of hydrolyzers of grape trimmings with a capacity of 50 thousand t per year. Works have been found dating to the time of industrial introduction on the utilization in the capacity of feed additives of the yeast group (B.P. Avakyan). In the republic, each year a significant quantity of ligno-cellulose raw materials are formed (straw, grape trimmings, remains of geraniums and others). With skillful and rational microbiological treatment of them, it is possible to essentially cancel out the feed deficit in the republic. In this regard, of special practical interest are processes for the enrichment of feed and food protein from plant remains, in particular from starch raw material by methods of solid-phase fermentation. The introduction of this technology in combined feed production is very promising.

There is no doubt that methanol fermentation for production of feed products, biomass and organic fertilizers based on microbiological processing of organic remains has promise. It has a very great technical-economic impact on disposal and utilization of wastes of animal husbandry. At the Institute of Microbiology of the Armenian SSR Academy of Sciences, specific work has been carried out in this direction and the required design-technological processes have been prepared. The creation in the republic of an installation for methanol fermentation in cattle-breeding farms, allows, simultaneous with production of methane and harmless wastes, the production of a significant quantity of feed products.

A valuable and promising raw material for microbiological production of sacchariferous products, of microbial protein and ethyl alcohol is the Jerusalem artichoke which can be widely cultivated in the republic in the unused and not very productive soils. There is no doubt that microbiological methods have a great future for the creation of non-waste productions. Their introduction in our republic is especially important for the utilization and disposal of organic and other wastes of chemical manufacturing. In this regard, the organization of production of feed protein and protein-vitamin concentrates of oxyhydrogen bacteria as the basis for utilization of hydrogen-containing wastes from the NPO [scientific-industrial association] "Nairit" has significant importance.

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9139
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UDC 582.284:577.158

PHENOL-OXIDIZING CAPACITY OF PREPARATIONS OF EXTRACELLULAR ENZYMES OF PLEUROTUS OSTREATUS (Fr.) KUMM

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 10, Oct 84 (manuscript received 22 Mar 84) pp 80-83

SEMICHAYEVSKIY, V. D., BUTOVICH, I. A. and TSAREVICH, N. V., Institute of Botony, UkSSR Academy of Sciences, Kiev; Institute of Physical Chemistry, UkSSR Academy of Sciences, Kiev

[Abstract] The properties of phenol oxidase were studied in connection with the promise of their use for analytic purposes, purification of phenol-containing industrial wastes and other uses. The use of wastes containing lignin, the biodestruction of which occurs with the active participation of phenol-oxidizing enzymes, is also quite important. Enzymatic activity was determined at 25°C by a polarographic method based on consumption of oxygen dissolved in the reaction medium by means of a Clark oxygen electrode, allowing recording of the kinetics of the reaction beginning at the moment when the enzyme was added, thus permitting measurement of the initial reaction rates. Phenol oxidase preparations isolated from culture fluid filtrates of the wood-digesting organism Pleurotus ostreatus have low selectivity for phenol substrates and oxidize a number of model lignin compounds. The stability and capability for oxidation of a broad range of phenol substrates indicates that the preparations are quite promising. References 15: 9 Russian, 6 Western. [1616-6508]

ECOLOGY

UDC 595.142

ANTHROPOGENIC EFFECT ON CASPIAN SEA NEREIS DIVERSICOLOR POPULATION

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 278, No 6, Oct 84
(manuscript received 22 Mar 84) pp 1510-1513

SVESHNIKOV, V. A. and ALIGADZHIYEV, M. M., Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov, USSR Academy of Sciences, Moscow

[Abstract] Comparative data were developed concerning the status of the population of nereis in both natural landscapes and landscapes exposed to anthropogenic effects in order to estimate the current status of the population of N. diversicolor as one component of the food base of commercial bottom-feeding fish in areas where young fish feed. Materials were collected along the coast of Dagestan in 1983 on board the Rybnadzor-2 with a bottom digger, a small trawl and other standard specimen collecting equipment. Significant reserves of invertebrate food organisms were found in the areas where the young fish feed. At least 1.5 tons of feed per hectare were collected from the sea bottom. Some 150 kg of nereis alone were present. In the lagoon exposed to anthropogenic effects, conditions were very favorable for existence of N. diversicolor. Intraspecies competition among nereis for habitat and food was observed. Over one ton of nereis were concentrated in each hectare in the lagoon. The presence of humans is thus favorable for development of N. diversicolor. Figure 1; reverences: 14 Russian.
[1611-6508]

UDC 574.52+58.095

CONVECTIVE MASS TRANSFER ON SURFACE OF SINGLE-CELLED ALGAE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84
(manuscript received 14 Feb 84) pp 766-768

VILENKIN, B. Ya. and PERTSOV, N. A., Institute of Evolutionary Morphology and Ecology of Animals imeni A. N. Severtsov, USSR Academy of Sciences, Moscow

[Abstract] The purpose of this work was to produce a quantitative relationship between the characteristics of convective mass transfer and estimates of the growth rate of the number of cells in algae. The cells of diatomaceous algae of the genera Synedra, Navicula, Fragillaria, Melosira, which dominate in plankton, were grown on organic glass plates and counted from days two through five of the experiment in thirty fields of vision on plates washed in currents with various speeds. The medium was filtered sea water which was not changed and had no additives. The installation was illuminated around the clock. An equation is derived which provides very high correlation with observed values of μ, indicating that under conditions of mineral nutrition deficit the specific growth rate of the cell population can be regulated by changing the diffusion characteristics of the boundary layer. Figure 1, references 9: 4 Russian, 5 Western.
[1605-6508]

UDC 595.782:575.174.5

MECHANISM OF ISOLATION OF SYMPATRIC SPECIES OF LEAFROLLERS ARCHIPS ROSANUS AND Z. XYLOSTEANUS (LEPIDOPTERA, TORTRICIDAE)

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 64, No 2, Feb 85
(manuscript received 2 Dec 83) pp 300-301

MINYAYLO, A. K., MINYAYLO, V. A. and POYRAS, A. A., All-Union Scientific Research Institute of Biological Methods of Plant Protection (Kishinev)

[Abstract] Archips rosanus and A. xylotseanus females were placed in traps in a cherry orchard in Tiraspol' (Moldavian SSR) in 1983 to check the hypothesis concerning the pheromone isolating mechanism of these species. Female leafrollers were placed in the traps on the day they hatched from pupae with one of each species in each of 6 groups of traps. The high specificity of sex pheromones of the species was obvious. In the first 2 days of life of the females, they did not attract males of the other species. Isolated cases of such attraction were noted only toward the end of life of the females. When females of both species were placed in one trap, A xylosteanus pheromone greatly suppressed attraction of Archips rosanus males with trapping of Archips rosanus being 9-fold less than when the bait was females of their own species.

The number of A. xylosteanus males attracted in the same period did not depend on the presence of Archips rosanus females. These data show that sexual isolation of these species is due to the difference of sex pheromones of the species. It is impossible to use one trap to capture both species.
References 3: 1 Russian, 2 Western.
[1811-2791]

ENVIRONMENT

UDC 614.777:615.285.7]-07

STUDY OF KINETICS OF TRANSFORMATION AND PROCESSES OF SORPTION OF CHLORINATED ORGANIC PESTICIDES AND POLYCHLORINATED BIPHENYLS UPON STORAGE OF SAMPLES OF SEA WATER

Moscow GIGIYENA I SANITARIYA in Russian No 10, Oct 84
(manuscript received 20 Feb 84) pp 85-86

ROOTS, O. O., Institute of Thermophysics and Electrophysics, Estonian SSR Academy of Sciences, Tallin

[Abstract] A study was made of the behavior of PCB and chlorinated organic pesticides (COP) in aqueous solutions. Four substances most common in sea water were selected: three pesticides and one biphenyl. These chlorinated organic hydrocarbons were added to fresh samples of Baltic Sea water with a salinity of 0.75%. It was found that by the end of the second week the concentration of biphenyls and pesticides had decreased by 70 to 80%, probably due to their adsorption on the walls of the glass vessels and by suspended matter. The decrease in concentration of pesticides and biphenyls during the first 105 days can be explained primarily by adsorption processes. Between 105 and 640 days, significant changes occurred on the chromatogram of the pesticides at 20-22°C. Pesticides were decomposed, reducing their content. After 640 days, the decrease in PCB content results from evaporation rather than decomposition. References 6: 3 Russian, 3 Western.
[079-6508]

UDC 614.71-07

METHODOLOGIC PROBLEMS OF PERFORMING EPIDEMIOLOGIC STUDIES IN CONNECTION WITH AIR POLLUTION

Moscow GIGIYENA I SANITARIYA in Russian No 10, Oct 84 (manuscript received 21 May 84) pp 54-56

GLEBOVA, L. F., CHERNOSVITOVA, T. V., BASKINA, G. F., ALDONYASOV, V. I., CHEKHONADSKIY, N. A., YUSYPOV, T. M. and SIVENKOVA, O. L.

[Abstract] Morbidity was studied, with 1-time or periodic (over three years) medical examination of two groups of children selected for identical social, home and climatic conditions, lack of contact of parents with occupational hazards and constancy of residence of the children in the area studied. It was found that the percentage of acute respiratory diseases stabilizes with a sample size of fifteen to twenty children. An automated system was developed to determine necessary sample sizes and methodologic approaches to yield reliable results for this and various other characteristics. Programs were developed which can be used to evaluate differences in health status of children living in areas with different levels of air pollution. The programs are not presented in this article. References: 6 Russian.
[079-6508]

OPERATION OF ARCHANGEL COMBINE FOR ALGAE PRODUCTION

Moscow PRAVDA in Russian 12 Mar 85 p 6

BATYGIN, A., "Pravda" Special Correspondent Arkhangel'sk Solovetskiye Island, Moscow

[Abstract] This article [entitled "Magic Tapes"] describes problems faced in the day-to-day operation of the Archangelsk Algae Production Combine, presents obstacles encountered in procurement and processing of algae and describes some aspects of the economic value of algae. The environmental impact of irrational harvesting of algae is discussed. Some experiments in algae "farming" are described. The Archangelsk Combine managed to fulfill last year's plan for sodium alginate and agar in spite of inadequate and inefficient equipment and the need to master new production plans, but the plan for mannite production was not fulfilled. The prospects for greater success in the future are discussed.
[294-2791]

ENVIRONMENTAL PROBLEMS CONCERNING LAKE ISSYK-KUL'

Frunze SOVETSKAYA KIRGIZIYA in Russian 24 Jan 85 p 3

KONURBAYEV, A., chairman of Central Asian and Kazakhstan Basin Department of Ichthyological Commission of USSR Ministry of Fisheries, candidate of biological sciences

[Abstract] This article [entitled "Don't Harm Yourself"] describes possible ecological damage to Lake Issyk-Kul as the result of economic development of the area. The Central Committee of the Khirghizia Communist Party and the government of the republic have promoted the idea of the creation of the Issyk-Kul'-Chu territorial-industrial complex to unite scientists and production workers in a thorough study to devise a suitable environmental plan which will permit rational development of the area. The major ecological threat to this region now is chemical pollution. There is special danger to fish populations from organochlorine pesticides. Urgent measures are required to prevent irreversible processes which will do great damage to the lake. The absolute need for providing all possible environmental protection for the area while continuing rational economic development of the area is discussed. [296-2791]

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EPIDEMIOLOGY

UDC: 599.323.4:591.522

DISTINCTIONS OF HABITAT DISTRIBUTION OF COMMON VOLE SIBLING SPECIES, MICROTUS ARVALIS AND M. ROSSIAEMERIDIONALIS (RODENTIA, MICROTINAE), AND THEIR ROLE IN FIELD-MEADOW TYPE OF ENDEMIC TULAREMIA SITES

Moscow ZOOLOGICHESKIY ZHURNAL in Russian Vol 64, No 2, Feb 85
(manuscript received 4 Jan 84) pp 269-275

[Text] Common vole sibling species--716 specimens of M. arvalis (2n = 46) and 709 M. rossiaemeridionalis (= M. subarvalis, 2n = 54)--were identified using electrophoresis of blood hemoglobin. The distinctions of their distribution in the southern part of Moscow Oblast, in a meadow-field type of endemic tularemia site, were demonstrated. In the course of a 3-year cycle of vole population dynamics (1981-1983), it was found that M. rossiaemeridionalis prefer to live the year round in stacks of hay or straw or, if none is present, in shrub-covered ditches, along the edges of fields and meadows. M. arvalis occupy all open field areas (with the exception of woods), penetrating into hay or straw only temporarily during the inclement parts of the year, when burrows are flooded in the spring and after vegetation is cut down. M. arvalis reproduces in the warm season (April-October), whereas M. rossiaemeridionalis do so the year round. The presence of these two species of carrier voles, which occupy different ecological niches in the biocenosis of the tularemia site, increases its stability. The zone of maximum activity of sites of the meadow-field and steppe types coincides with the area of sympatric distribution of these vole species.

The recent revision of the polytypic common vole species made it possible to distinguish five independent species: Trans-Caspian, Kirghiz, Mongolian, common and East European (Malygin, 1983). The last two--common (Microtus arvalis Pallas) and East European (M. rossiaemeridionalis Ognev = M. subarvalis)--were found to be sympatrically distributed over virtually all of European SSSR, in Trans-Caucasus and countries of the Balkan Peninsula (Kral et al., 1980). These species play an important part in the biocenoses of the steppe and forest zones in the temperate belt of Europe; they are serious agricultural pests and carriers of pathogens of a number of infections and invasions that are dangerous to man and domestic animals. The extensive material gathered over many decades on biology of the "common" vole pertains to an equal extent to both M. arvalis and M. rossiaemeridionalis, since they

cannot be distinguished by their external features. However, more and more information is being accumulated concerning substantial differences in ecology, physiology and behavior of these sibling species.

At the present time, it is possible to identify M. arvalis and M. rossiaemeridionalis according to karyological data, as well as structure of the head of the spermatozoon and baculum (Meyer et al., 1969; Aksenova, 1973; Aksenova, Tarasov, 1974). These methods are quite time-consuming and seldom used in zoologists' practical work. The simplest method of identifying these species, which is suitable for examining large numbers of field specimens, was found to be electrophoresis of blood hemoglobins (Dobrokhotov, Malygin, 1982). Common voles (2n = 46) are characterized by one type of hemoglobin, whereas East European ones (2n = 54) are characterized by two types, which is distinctly manifested by one or two bands, respectively, on electrophoregrams of their blood. Using this identification method, we studied the ecological distinctions of common voles, which could affect their role in maintaining an endemic tularemia site of the meadow-field type in the southern part of Moscow Oblast in 1981-1983.

Material and Methods

The tularemia site of the meadow-field type in Stupinskiy Rayon of Moscow Oblast is situated in a region that is typical of the Central Russian Plain, and it has been well investigated (Olsuf'yev et al., 1974). The relatively uniform topography of that region is interrupted only by the Lopasnya River valley and its small tributaries. Forests occupy almost half the area and are represented by conifer and deciduous tree plantations or birch woods among the fields. The meadows are situated along small river banks, in shallow ditches or in forest glades and felled areas. Common voles predominate in all areas, except forests.

In all, 1425 common voles, 716 of which were M. arvalis and 709 M. rossiaemeridionalis, were trapped in enclosing, spring and pit traps, by examining straw and hay stacks and digging up burrows during zoological and parasitological inspections between March 1981 and October 1983. The age and generative state were determined in all specimens obtained. Presence of tularemia epizootics was established by bacteriological and serological methods.

Electrophoresis of hemoglobins was performed on acetyl cellulose strips in alkaline buffer (tris-EDTA-boric acid, pH 8.6, ionic strength 0.02). Hemolysates were prepared by adding 3 drops 0.1% ethylenediamine tetraacetic sodium to 1 drop whole blood taken from the tail or digits of live voles, or by adding 3 drops of this solution to a blood clot or piece of heart extracted from the chest of animals that were dead when trapped. The specimens were examined on the same day or in a frozen state after brief storage in a refrigerator (-12°). Hemolysates were applied with an applicator (stamp) on a strip of acetyl cellulose soaked in advance in buffer solution and placed in a chamber where electrophoresis was performed for 10-20 min at 350 V. Phoregrams can be easily read immediately, but image contrast can be enhanced by using protein or hemoglobin-specific dyes (ponceau S., benzidine and others). After discoloration of the background in 5% acetic acid, the strips were dried for storage. One can identify the species of 40-60 specimens in 1 h.

Results and Discussion

The biology of common voles in this territory (Mikhnevo tularemia site) was studied comprehensively and repeatedly described in the literature (Kulik, 1951; Karaseva, 1952; Naumov, 1953; Kucheruk and Rubina, 1953; Maksimov, 1964, and others), but at that time the existence of sibling species there was not known. For this reason, as we gathered material in the same places, we tried to determine which species we were dealing with when describing ecological distinctions of the voles.

The trapping results over the entire observation period are summed up in the Table. In the group of open field habitats, we included farmed land (wheat, barley, oats, perennial grasses), meadows (interfluves and ravines), boundaries and edges of fields next to forests overgrown with weeds, felled areas with diverse grasses and shrubs. Straw and hay stacks are typical objects in contemporary farmland; they are stacked at the present time by a mechanized method and consist of straw from cereal crops and hay from sown perennial grasses (clover, timothy, Sudan grass, etc.); their volume is usually large, 250-500 m^3. They are stacked in July-August, immediately after harvesting and mowing, and they are left in the fields for the winter. When there is snow, straw and hay are transported to livestock farms, but when there is sufficient feed many of the unusued stacks remain in the fields for the entire following year also. In such cases, they usually rot, become consolidated and even overgrown with weeds.

Distribution of M. arvalis and M. rossiaemeridionalis habitats in a tularemia site of the meadow-field type in southern Moscow Oblast in 1981-1983

Months of observation	M. arvalis		M. rossiaemeridionalis	
	open sites	straw, hay	open sites	straw, hay
February	--	5	--	220
March	--	8	--	29
April	37	67*	0	76
May	166	13*	6	158
July	229	25	22	49
September	70	34**	3	81
October	35	27**	6	59
totals	537	179	37	672

*In small piles of straw scattered during winter transportation.
**In stacks where there were no M. rossiaemeridionalis.

This territory is characterized by fluctuations in number of common voles in 3-year cycles (less often 2-4 years). The time of our observations covers one complete cycle of population dynamics. There was a maximum number of voles in the fall of 1980, when we counted over 5000 burrow entrances per hectare farmland. There were few voles in the spring and in all of 1981. Their number started to increase again in 1982 and, growing gradually, it reached the next maximum in the fall of 1983.

The distinctions of habitat distribution for each species were similar in all the years of our observations, which enables us to provide the following overall description of their territorial distribution.

East European voles constitute the foundation of the population of small mammals in hay and straw in all seasons. This is attributable not only to the favorable feed, protection and microclimate conditions of these sites. The voles of this species spent all summer in stacks of the previous year that had been left on the fields and were rotten or damp, even if they were situated on clover fields with an abundance of feed. The animals would exit from a stack for a brief time over a distance of 5-10 m in a system of feed trails and passages, returning to the stack in case of danger. We failed to discover colonies of this species even 10-15 m away from a stack, regardless of presence or absence of M. arvalis colonies in the same territory.

In 3 years of special search, we succeeded in finding only 3 sites of summer habitats of East European voles in natural biotopes: 27 animals were caught in a shallow, humid ravine overgrown with dense shrubbery (alder, bird cherry, aspen) and diverse grasses, 9 in weeds with shrubs along the edge of the forest and clover field and 1 in ripe wheat (young specimen). This species does not settle in fresh stacks, rather it waits a few weeks. Most often the range of migration from possible habitats, in our opinion, of these animals from the boundaries of a field to the stacks in its central portion constitutes 200-500 m. In July 1983, we caught 15 East European voles out of 970 trap/days along the edge of a ravine and none in September, whereas in 8 fresh stacks in an adjacent wheat field, the number of specimens of this species increased from 4 to 29 per 200 trap/days. Reproduction of East European voles in hay and straw takes place the year round, though less intensively in the winter. All of the adult specimens also multiply actively during the warm part of the year in field habitats.

Common voles were always predominant in open sites. Mass settling of this species in straw and hay was observed only twice a year: during the spring snow melt (April), when burrows were flooded, and immediately after cutting down the farm crops (July-August), when the voles were deprived of their natural shelters. In the spring, these voles were encountered more often in piles of straw (up to 2 m^3 in volume) scattered during transportation in the winter than in the stacks proper. In the summer, common voles appear in fresh stacks on the day they are formed; however, the number of this species gradually diminishes as the stacks become inhabited by East European voles. During the snowy period of the year they constitute only about 5.2% of the common vole population in straw and hay. If, for some reason, East European voles do not settle there, common voles remain in such stacks up to the winter. We observed this on one of the large fields (over 200 ha in the village of Mikhaylovskoye), where common voles in stacks in the central part (300-500 m from the edge) constituted 92% of the specimens caught in September and October. However, there too, East European voles were predominant by the spring.

Intensive reproduction of common voles begins in the second half of April and continues in the entire warm part of the year (up to November). During the year of a large population (1983), the last pregnant females were recorded in

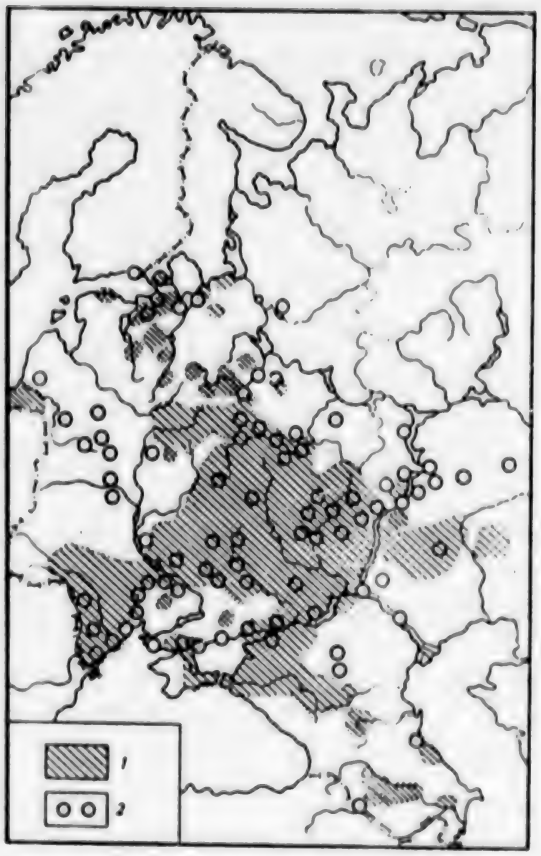
September, even though feed and weather conditions that fall were beneficial. Common voles that settled in stacks continued to reproduce in them for a longer time, but we did not encounter any gestating females in the winter and spring. We seldom observed reproduction of this species under the snow, in nests on meadows and fields, and there were usually no young specimens in spring populations. Litter size was virtually the same in both species (4-7 offspring), and it depended primarily on the age of the females and season of the year.

Our findings confirm the conclusion that common voles are better adapted to living in diverse natural conditions, their eurytopicity (Malygin, 1974). Conversely the East European voles are more stenotopic, they prefer to inhabit humid biotopes. Probably, the perennial fluctuations in population size of these species are independent. However, the hypothesis of Mokeyeva and Chentsova (1981) that there is periodic dominance in different years of either one or the other species in the same field requires confirmation, since it was advanced on the basis of a small field sample.

The correlations between these species are not always competitive. Thus, at the sites of their joint habitats in open sites, animals of both species were caught in adjacent traps (5-10 m), their individual areas were overlapping and the hypothesis of the above-cited authors that there are 30-50-meter intervals between settlements of these species was not confirmed. Judging by behavior, less aggressiveness and ease of inbreeding among East European voles, they adapted better to living in crowded settlements in hay and straw (Zorenko, 1980; Mokeyeva, Chentsova, 1981). When raised in a vivarium with use of hybridization of closely related specimens, East European voles can exist for decades, whereas lines of common voles rapidly become extinct.

We have yet to determine where the demonstrated lifestyle patterns of these vole species are inherent in the entire territory of their sympatric distribution. For this, it will be necessary to conduct mass scale studies of field material and, probably, electrophoresis of blood hemoglobins is the only method at the present time that is suitable for such work. When we identified the species of 469 voles trapped at random in the northern part of Moscow Oblast, in Yaroslavl, Ryazan, Orel, Rostov oblasts and Lithuanian SSR, we also found absolute prevalence of M. rossiaemeridionalis in straw and hay and of M. arvalis in field sites.

Gray voles are the chief source of infection in endemic sites of tularemia of the meadow-field and steppe types. The well-marked ecological distinctions of the sibling species enable us to make a different assessment of their role in maintaining endemic sites. During the tularemia epizootic in the winter of 1980-1981, the pathogen was isolated from both vole species. However, according to their lifestyle, it can be assumed that the course of an epizootic and dissemination of the pathogen in nature are determined primarily by M. arvalis voles, whereas the epidemic hazard of a site is determined by M. rossiaemeridionalis. Expressly the latter infect grain, straw and hay, well water and farm products, which are the main sources of human infection. The high degree of contacts between the sibling species enables the pathogen to readily



Distribution of endemic tularemia sites of the meadow-field and steppe types in European SSR (1) according to Olsuf'yev and Dobrokhotov, 1969, as compared to known sites of finding M. rossiaemeridionalis (2) according to Malygin, 1983, with additions

penetrate from the scattered settlements of M. arvalis into populations of M. rossiaemeridionalis concentrated in hay and straw during the cold part of the year.

The stability of an endemic site no doubt increases when it contains several similar carrier animals that occupy different ecological niches, in our case, two species of common [gray] voles. The fact that the boundaries of the most persistent tularemia sites of the meadow-field and steppe types coincide with the area of sympatric distribution of both vole species is in favor of such a conclusion (Figure).

Conclusions

1. Electrophoresis of blood hemoglobins is a simple and reliable method of identifying sibling species of common voles.

2. East European voles (M. rossiaemeridionalis = M. subarvalis) prefer to live the year round in ricks of straw and stacks of hay, and in their absence are encountered in overgrown ravines and weed-covered edges of fields and meadows. This species reproduces the year round.

3. Common voles (M. arvalis) are more eurytopic, they settle in all open field sites (with the exception of forests), and penetrate into ricks and stacks only during inclement periods of the year. They reproduce from April to October.

4. The most active tularemia sites of the meadow-field and steppe types coincide with the territory of sympatric distribution of both vole species. According to the main distinctions of their lifestyle, it can be assumed that common voles are more responsible for the epizootic state of a site and dissemination of the pathogen in nature, whereas East European voles determine its epidemic manifestation.

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10,657
CSO: 1840/1810

UDC 616.9-002.3-07(048.8)

CARRYING OF PATHOGENIC MICROORGANISMS AS PHASE IN PRESERVATION OF PATHOGEN BETWEEN EPIDEMICS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 11 Jan 84) pp 9-16

CHAKHAVA, O. V. and GORSKAYA, Ye. M., Institute of Epidemiology and Microbiology imeni N.F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] Whereas previously it was generally accepted that many infectious diseases such as cholera, dysentery, diphtheria, meningitis and poliomyelitis could be carried by persons showing no signs of the disease, many authors now reject this possibility in principle. This review, based on a comparative analysis of the symbiosis of representatives of the normal microflora and infectious disease pathogens with the host organism, discusses the possibility of carrying pathogenic microorganisms from the standpoint of ecology, gnotobiology and clinical medicine. Carrying pathogens is determined to be manifested variously, beginning with forms which do great harm to the host and ending with extreme cases of mutualism, as a result of which both host and pathogen win. Considering that infectious disease pathogens can persist even in an immune organism, it becomes obvious that healthy persons can in fact carry pathogens. References 87: 74 Russian, 13 Western.
[124-6508]

UDC 616.98:578.824.11]-036.21

TYPOLOGIC CLASSIFICATION OF NATURAL FOCI AND STRUCTURE OF WORLD AREA OF DISTRIBUTION OF NATURAL RABIES

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 15 Oct 83) pp 16-21

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[Abstract] The typologic structure of the world area of natural rabies is based upon characteristic features of focal parasitic systems (focal biocenoses). The typologic unit selected was thus the predominant biocenotic structure of foci, including species of primary vertebrate hosts close in systematic and ecologic respects and the ecologically related geographic biovariant of the rabies virus. A table lists the typologic structure of the world area of distribution of natural rabies including type of rabies, geographic subtype, territory occupied and biocenotic structure, including species of major biological hosts, species of additional biological hosts and geographic biovariant of pathogen. A map of the world illustrates the structure of the world nosologic area of distribution of natural rabies, subdivided into seven types plus areas where no types of rabies are present. Figure 1; references 6: 4 Russian, 2 Western.
[124-6508]

GENETICS

BIO-ENGINEERING AND PLANT GROWTH

Moscow MOSCOW NEWS WEEKLY in English No 10, 1985 p 10

[Article by Anatoly Lepikov: "Designers of Life"]

[Text] A group of research scientists headed by Raisa Butenko, Corresponding Member of the USSR Academy of Sciences, have been awarded the State Prize of the USSR for Science and Engineering (1984) for a series of works on "Development of Fundamental Principles of the Cellular (Vegetable) Engineering of Plants."

What is the Cellular Engineering of Plants: How Can One Create a New Organism?

An important step towards controlling natural processes was made when scientists learned to obtain genetically modified plants, bypassing the traditional sexual crossing. In other words, the "parents" are not gametes (reproductive cells) but somatic cells. This is achieved as follows: with the help of special enzymes their hard polysaccharide coating is destroyed, making these "naked" cells (scientists call them isolated protoplasts) or their parts merge with each other. The hybrid cells that merge in this way are used to obtain cellular clones which can give life to a whole hybrid plant.

The possibility of obtaining new organisms, not just modified cells, will enable cellular engineering to become important in plant breeding. Special nutrient media have already been developed, in which an individual cell or a group of cells loses the symptoms characteristic of the vegetable tissue, to which they used to belong. They can live and multiply for dozens of years, creating an unorganized cellular mass. If their conditions of "life" are modified in the proper way, it will be possible to return the cells to organized growth and to obtain a plant-organism again. So that studying the genetic mutability of plants, scientists don't have to work today with organisms, but with millions of cells in a test tube, and then "return" again to the whole plant. Need it be said how much more effective, quicker and cheaper this is than cultivating millions of plants which, moreover, occupy large areas of land.

Computer-Controlled Growth

The research scientists, who were honored with the USSR State Prize, have already received whole plants from the cells of tobacco, potato, lucerne, carrot and lemon, including those which carry modified properties. They were successful with wheat and cotton. They also developed hybrids of plants which previously simply did not exist in nature. For instance, the hybrid of a potato "designed" by biologists possesses a selection of genes making it resistant to some viruses, which are a scourge of modern potato growing. This is the most potent practical achievement of cellular engineering in modern world science.

Perhaps, the main thing is that the Soviet scientists have been able to develop universal and simple methods with which it is possible literally to construct hybrid forms of plants with preset properties.

"Modern physico-chemical biology," says Raisa Butenko, "enables us to create technologies that are fundamentally different from those which have served man for many years. Traditionally we have used the organisms of animals, plants and microbes to obtain economically important products. Modern biotechnology suggests new, experimentally developed systems for the purpose - the freely living cells and artificial complexes to which particular genes have been 'transferred' in advance. Use can be made of a computer controlled system for growing cells and tissues. This makes it possible to control automatically the growth and biosynthesis of the cellular mass of the products necessary for man. The main genetic characateristics of the initial species of the plant are preserved even in the case of a very prolonged cultivation of the cell. And lastly, in a number of cases it is again possible to obtain from the cultivated cell a plant capable of normal growth and development."

Any Plant Can Be Constructed

Today at least three directions in developing new technologies on this basis are visible in many countries.

One of them is the industrial production of biologically active substances of vegetative origin. The artificially obtained strains of cells often contain 10-20 times more such substances than the initial plants.

Another direction is the use of tissue and cell cultures for the rapid multiplication and cultivation of plants. This method is already used for at least 433 species of plants belonging to 82 families. The methods of optimizing all stages of the so-called microclonal multiplication have been worked out: isolation of a piece of tissue from the plant, obtaining numerous shoots, their rooting, and the transplantation of plants into the soil. Whereas under ordinary vegetative multiplication it is possible to receive no more than 100 daughter plants in a year from the initial plant, microclonal multiplication produces from 100,000 to one million of them. It is essential that the cultures of cells can not only be maintained in the state of growth, but can also be

preserved for a long time under superlow (-196°C) temperatures. Thus, the culture of carrot cells returned to life after seven years of storage in liquid nitrogen retain completely viability and all their properties. It is obvious that in the not too distant future the cryobanks of plant cells and tissues, especially those that are disappearing and are rare, will become an important method for preserving the genofund of unique living systems.

And lastly, the third direction. The latest methods of bio-engineering are being successfully used for the genetic modification of the cell and, consequently, the plant obtained from it. This has made it possible to revolutionalize literally the process of creating new forms and varieties of plants and quickly select those which are more resistant to diseases and unfavorable external conditions. Specially designed plants will be insensitive to poisons, give stable yields on acidic and alkaline soils, live on saline soil, and normally develop under high or, in contrast, low temperatures. Work with plants on the cellular level makes it possible to enrich experimentally wheat with essential amino acids and improve the quality of a whole number of agricultural crops.

In short, today the use of the culture of tissues and cells is opening up truly boundless prospects for the biotechnological industry and agriculture.

CSO: 1840/303E

UDC 577.214.622:575.224

LOCALIZATION OF MUTATION LEADING TO RESISTANCE OF E. COLI RNA-POLYMERASE TOWARDS STREPTOLIDIGINE ANTIBIOTIC IN proB GENE CODING FOR β-SUBUNIT OF AN ENZYME

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 11, No 1, Jan 85
(manuscript received 13 Jul 84) pp 132-134

LISITSYN, N. A., SVERDLOV, Ye. D., MOISEYEVA*, Ye. P. and NIKIFOROV*, V. G., Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow; Institute of Molecular Genetics*, USSR Academy of Sciences, Moscow

[Abstract] In the present work, for the first time, the localization of the stability mutation of RNA polymerase towards the streptolydigin antibiotic was established. It was shown to consist of a double substitution: $Gly^{544} \rightarrow Asp$, $Phe^{545} \rightarrow Ser$ in the region where most of the rif-r mutations take place. Thus it was shown that the stl-r mutation was localized in the same segment of rpo-B gene where 9 of 10 studied rif-r mutations were localized. The mechanism of action of the antibiotics is different. It could be assumed that this region participated in formation of the elongation of NTP binding site as well as in RNA chain binding and translocation site blocked by rifampicin. References 12: 2 Russian, 10 Western (4 by Russian authors).
[1791-7813]

UDC 575.113:599.323.4

GENOTYPE OF RECIPIENT AND EFFECTIVENESS OF ACTION OF PHEROMONES CONTROLLING AGGRESSIVE BEHAVIOR OF DOMESTIC MOUSE MUS MUSCULUS L.

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 278, No 6, Oct 84
(manuscript received 11 Mar 84) pp 1479-1481

NOVIKOV, S. N. and BABALYAN, V. V., Institute of Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] Aggressive behavior was studied in territorially isolated eight nine-week-old males of two highly inbred geneologically dissimilar lines CBA/LacSto and C57BL/6Sto of Mus musculus L. in relation to castrated $CBAB6F_1$ intruders. The behavior of the animals was recorded in ten-minute tests on four successive days. The physiological activity of urine specimens of four genotypes of reproductively mature males was determined. The genotype of the recipient and pheromonal stimulus were found to influence aggressive behavior of animals quite reliably with respect to all three criteria tested. The influence of the interaction of the factors studied (genotype and stimulus) was observed only for total time and frequency of attacks. Interaction observed

between recipient genotype and pheromonal stimulus indicates a variation in the effect of the pheromonal stimulus among different lines of laboratory mice. Pheromonal stimulus plays an important role in the regulation of aggressiveness of male mice, but influences mice of different genotypes differently. Figure 1; references 15: 8 Russian, 7 Western.
[1611-6508]

UDC 507.21

DESIGN OF FULL 'LIBRARIES' OF ECO RI FRAGMENTS OF DNA OF HUMAN HERPES SIMPLEX VIRUS TYPES 1 AND 2

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84 (manuscript received 20 Feb 84) pp 710-712

ZHIDKOVA, N. I., GARAYEV, M. M., FILATOV, F. P., URYVAYEV, L. V., TIKHONENKO, T. I. and ZHDANOV, V. M., Active Member, USSR Academy of Medical Sciences, Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] The most convenient and sensitive probes for studying integration of herpes DNA into the genomes of transformed cells are recombinant plasmids containing various herpes simplex virus genome fragments. The major task of this work was construction of complete "libraries" of genome fragments of herpes simplex virus type 1, strain F and herpes simplex virus type 2, strain G. Cosmid pHC79 was used as the cloning vector. Conditions of incomplete hydrolysis of the viral DNA of specific endonuclease (R) Eco RI were used to produce series of type 1 and type 2 DNA fragments with dimensions in the range of 21 to 30 megadaltons. Cloning of the type 2 virus by hybridization in situ established 90% of all Ap^rTc^r colonies obtained by transduction of E. coli HB101 cells yielded a positive signal, whereas E. coli strain LE392 yielded 60% positive results. The experiments yielded sets of Eco RI fragments of the DNA of types 1 and 2 herpes simplex virus. The "libraries" constructed are convenient sources for the production of hybridization probes for analysis of herpes simplex virus-transformed cell lines, and also for identification of virus-specific sequences in DNA isolated from human tumor cells. Figure 1; references: 8 Western.
[1605-6508]

UDC 579.841.11:579.252.5.04:578.81

FREQUENT OCCURRENCE OF TRANSPOSON PHAGES IN NATURAL PSEUDOMONAS AERUGINOSA POPULATIONS

Moscow GENETIKA in Russian Vol 20, No 10, Oct 84 (manuscript received 25 Oct 83; in final form 5 Mar 84) pp 1612-1619

AKHVERDYAN, V. Z., KHRENOVA, Ye. A., BOGUSH, V. G., GERASIMOVA, T. V., KIRSANOV, N. B. and KRYLOV, V. N., All-Union Scientific Research Institute of Genetics and Selection of Industrial Microorganisms, Moscow

[Abstract] Only one phage has been found which is specific for E. coli and related to the phage MuI. Transposon phages are apparently more common in P. aeruginosa, since three containing DNA with Mu-like structure were found in a small number of samples. This work represents a check of the reliability of criteria used for locating such phages and a study of five new phages. They are shown to be similar to the phages D3112 and B39 differing from them and each other in the nature of distribution of sites sensitive to various endonucleases. The phages selected fall in four immunity groups with the following common characteristics: phage particle morphology, lytic activity spectrum, serologic affinity, similar genome dimensions, heterogeneous nonphage DNA attached to the end of the phage genome, and resistance of DNA to effects of BamHI endonuclease. The criteria used to select the transposon phages are demonstrated to be reliable. Resistance of DNA to BamHI restrictase may serve as a major criterion in selecting transposon phages, while sensitivity to endonucleases PstI and SalGI can probably be used to place new phages either in group D3112 or group B3. Figures 5; references 13: 10 Russian, 3 Western. [125-6508]

UDC 575.174.015.3

GENETICS OF POPULATION OF TAIGA HUNTERS AND REINDEER BREEDERS OF CENTRAL SIBERIA. BIOCHEMICAL MARKERS OF GENES Hp, Tf, Gc, Alb, GLO_1, PGM_1, AcP and EsD

Moscow GENETIKA in Russian Vol 20, No 10, Oct 84 (manuscript received 13 Oct 83) pp 1701-1707

RYCHKOV, Yu. G., SPITSYN, V. A., SHNEYDER, Yu. V., NAZAROVA, A. F., BOYEVA, S. B., NOVORADOVSKIY, A. G. and TIKHOMIROVA, Ye. V., Institute of General Genetics imeni N. I. Vavilov, USSR Academy of Sciences, Moscow; Scientific Research Institute and Museum of Anthropology imeni D. N. Anuchin at Moscow State University imeni M. V. Lomonosov

[Abstract] The purposes of this work were: to describe the specifics of the gene pool of the population of the Evenkiyskiy Autonomous Okrug in Central

Siberia with respect to biochemical gene markers, to determine the degree of commonality of the specifics found for two different ethnic groups of the native population, and to determine possible means and factors controlling the formation of the gene pool of this Siberian native population with respect to genes coding serum and erythrocyte proteins in the human body. It was found that the population, being polyploid in race type, has a noncharcteristic combination of gene frequencies for mongoloids. This "Central Siberian" complex may arise in the course of adaptation to Central Siberian environmental conditions. Figures 3; references 17: 9 Russian, 8 Western.
[125-6508]

UDC 575:591

MEDICAL-GENETIC STUDY OF POPULATION OF TURKMENIA. VI. ANALYSIS OF GENETIC COMPONENT IN DISPERSION OF FERTILITY IN SMALL ISOLATED POPULATIONS

Moscow GENETIKA in Russian Vol 20, No 10, Oct 84 (manuscript received 1 Nov 83; in final form, 9 Apr 84) pp 1714-1718

REVAZOV, A. A. and BOL'SHAKOVA, L. P., Institute of Medical Genetics, USSR Academy of Medical Sciences, Moscow

[Abstract] One approach suggested by Crowe was used to estimate natural selection pressure in an isolated Turkmenian population. This study was based on questionnaires filled out during interviews with women who were to be married. Information was gleaned from about five hundred interviews concerning women past childbearing age (over 45 years of age). The genetic component of dispersion of fertility is calculated by computing the correlation coefficient between various types of immediate relatives. The multifactorial Volkner-Smith model was used to estimate the genetic component of dispersion. A low mother-daughter correlation coefficient, 0.07, results from the significant reduction in infant mortality over the past fifteen to twenty years. Low values of sister-brother and brother-brother correlation coefficients (0,04) can be explained by the small influence of males on female fertility. The sister-sister correlation coefficient (0.22) is quite high, explained primarily by the fact that no family planning is practiced in this population.
References 11: 5 Russian, 6 Western.
[125-6508]

UDC 612.015:1:325:3(571.65+571.66)

BIOCHEMICAL POLYMORPHOUS SYSTEMS IN POPULATIONS OF IMMIGRANTS TO NORTHEASTERN USSR. III. SELECTIVITY OF MIGRATION BEHAVIOR WITH RESPECT TO POLYMORPHOUS LOCUS GENOTYPES

Moscow GENETIKA in Russian Vol 20, No 10, Oct 84 (manuscript received 21 Nov 83) pp 1719-1725

SOLOVENCHUK, L. L., Institute of Biological Problems of the North, Far Eastern Scientific Center, USSR Academy of Sciences, Magadan

[Abstract] Differences in genotype of far northeastern residents from the average genotype of all Russia increase with increasing duration of life in the northeast. The genotype structure of newly arriving persons is significantly closer to that of the Russian populations of the middle latitudes, indicating primary selectivity of departure from the region. To confirm this, the frequencies of pheno-genotypes were analyzed for twelve polymorphous systems among persons leaving the area and remaining in the area four years after first arrival. It was shown that the selectivity of departure with respect to genotypes of the polymorphous systems studied determines the specificity of the genetic structure of this population. The selectivity is more highly expressed in males than in females and is most significant during the first few years spent under the extreme conditions of the northeast. Departure selectivity is shown to be the most important but not the only factor determining the specifics of the gene structure, since reliable differences are found in frequencies of genotypes between those departing and those remaining with respect to certain loci for which no frequency gradient is found as a function of duration of time spent in the region. Figure 1; references: 9 Russian.
[125-6508]

CREATIVE SESSION AT INSTITUTE OF GENERAL GENETICS, USSR ACADEMY OF SCIENCES

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 18, No 5, Sep-Oct 84, pp 394-395

GOLDA, D. M.

[Abstract] The Institute of General Genetics, USSR Academy of Sciences, held a creative session dedicated to the 100th anniversary of the death of G. Mendel, the 50th anniversary of the creation of the Institute of Genetics and the naming of the Institute in the honor of N. I. Vavilov. The session was held on 30 January 1984. The life and works of G. Mendel and N. I. Vavilov were discussed. The workers of the Institute were congratulated by various delegations including one from Bulgaria and one from the Ukraine on the anniversaries they were celebrating. Numerous telegrams received from scientific research institutes and individuals were read. No significant scientific papers at the session are mentioned in this report.
[073-6508]

FOOD TECHNOLOGY

VITAMIN ENRICHMENT OF FOODS

Moscow TRUD in Russian 16 Mar 85 p 3

[Article by POMINOV, A., "Bread and Vitamins"]

[Abstract] The Institute of Nutrition of the USSR Ministry of Health has undertaken a program of enriching basic foodstuffs with vitamins. V. Spirichev, doctor of biological sciences and chairman of the Vitamins Problem Commission of the USSR Academy of Medical Sciences, has explained that this is necessary because many people neglect to provide an adequate vitamin intake for themselves. There is no danger of an overdose, since the vitamins have a wide safety margin, and the addition of vitamins may in fact improve the taste of many products. Such enriched products are expected to be on store shelves within the next few years.
[293-12172]

HUMAN FACTORS

SPEECH ANALYSIS SYSTEM FOR ASSESSING PILOTS' WORKING FITNESS

Moscow MEDITSINSKAYA GAZETA in Russian 10 Apr 85 p 4

[Article by S. Dvigantsev]

[Abstract] The article reports on the development and features of a system, "Equipment for Distinguishing Speech-Signal Parameters" (SVPRS). It is intended for use in radio conversations with pilots, drivers and other operators who must work for long periods of time. The system makes it possible to evaluate the emotions and working fitness of such operators on the basis of the sound of their speech. The SVPRS was developed by a group of specialists which included personnel of the USSR Academy of Sciences' Institute of Higher Nervous Activity and Neurophysiology, and a laboratory of the aviation medicine department of the State Scientific Research Institute of Civil Aviation. This laboratory is headed by Candidate of Medical Sciences Aleksandr Ivanovich Onufrash.

The system's components are said to include a magnetic memory device, audio-signal filters, a frequency analyzer, sound-pressure recorders, a specially programmed minicomputer, and data-input devices and other instruments for processing recordings of human speech. With the aid of the SVPRS, an operator's condition can be diagnosed on the basis of a single word containing two vowel sounds, it is claimed. Changes in voice tone which are indicative of stress can be detected, for example.

The use of systems of this type is foreseen in ground and water transport as well as in commercial aviation. With the aid of such systems, for example, airport traffic controllers will be able to determine, on the basis of a brief dialogue, when deviations from optimal working fitness occur in pilots on long and difficult flights.

FTD/SNAP
COS: 1840/1839

IMMUNOLOGY

CELLS' INFLUENZA-VIRUS RECEPTION MECHANISM

Moscow VECHERNYAYA MOSKVA in Russian 27 Mar 85 p 2

[Article by R. Akhmetov]

[Excerpt] Representatives of a young and promising science -- molecular biology -- have begun to study the influenza virus actively in recent years. Results obtained by scientists of the USSR Academy of Sciences' Institute of Bioorganic Chemistry imeni Shemyakin have aroused hope that effective new methods will appear for combating the causative agent of this disease.

"All of the troubles that influenza causes us stem from a causative agent which remained invisible for a long time," said project director L. Bergel'son, corresponding member of the USSR Academy of Sciences.

"A receptor links the influenza virus with a cell and ensures the virus' penetration of the cell membrane. The chemical structure of this receptor was unknown until we did our research.

"We isolated the receptor, removed foreign molecules from it and studied it carefully. The receptor proved to be a complex molecule consisting of sugars and lipoids. It was established experimentally that the virus is capable of invading a cell only when such molecules are present.

This research project was not very complex in conception, but it took years of painstaking work. Taking part in it were associates of the USSR Academy of Medical Sciences' Institute of Virology imeni Ivanovskiy, who supplied us with viruses and a radioactive marker. This made it possible to determine precisely how many viruses penetrated a cell, in each experiment."

"What is the result and the practical significance of your work?"

"We have succeeded in ascertaining the nature of one of the cell components which take part in reception of the influenza virus. We do not rule out the possibility that other components which are part of the receptor complex exist on the surface of cells. Further research will show what the ultimate mechanism of this process is.

"Our work might provide a basis for a therapeutic method which is new in principle. This means that a virus would not be prevented from penetrating a cell but would be deceived; it would be given a receptor obtained by biochemists. The key would then go into an artificial lock and the virus would be deprived of the capability of interacting with the cell. Of course, this is only an intriguing idea as yet, but it is a promising one."

FTD/SNAP
CSO: 1840/305E

UDC 576.8

ANTIBODY-STIMULATING AND PROTECTIVE EFFECT OF M-PROTEIN CONJUGATE OF INFLUENZA VIRUS WITH SYNTHETIC POLYMER

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84
(manuscript received 2 Apr 84) pp 720-722

PETROV, R. V. and ZHDANOV, V. M., active members, USSR Academy of Medical Sciences, KHAITOV, R. M., NORIMOV, A. Sh., NEKRASOV, A. V., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] A copolymer of acrylic acid and N-vinylpyrrolidone with equimolar ratio of components and molecular weight about 100,000 was synthesized for covalent conjugation. Conjugation of M-protein with the copolymer was performed by the carbodiimide method at 4°C in 0.05 M phosphate buffer (pH 6.0) using water-soluble p-toluene sulphonate-N-cyclohexyl-N'-[2-(4-morpholinium) ethyl] carbodiimide. Experiments were performed on CBA female mice immunized once intraperitoneally with isolated M protein or M-copolymer conjugate at 4-20 µg of M-protein per mouse. The presence of antibodies to M protein was determined fourteen days after immunization. The animals were intranasally infected with a pathogenic version of A/USSR/05/80 influenza virus fourteen days after immunization at 10 LD_{50}. Immunization of the mice with isolated M protein of the influenza virus had practically no protective effect upon infection with pathogenic virus. However, there was a clear protective effect upon immunization of the animals with M-protein covalently conjugated with synthetic polymer immunoadjuvant. The relatively high protective activity of the conjugates is apparently related to the basic difference in the mechanism of the immunostimulating effect of ordinary adjuvants such as aluminum hydroxide and synthetic polymer macromolecules covalently bonded with the protein antigen. Figures 2; references 15: 1 Russian, 14 Western.
[1605-6508]

UDC 612.017

VACCINATING EFFECT OF SURFACE ANTIGEN CONJUGATES OF INFLUENZA VIRUS WITH SYNTHETIC POLYMER CARRIER

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84
(manuscript received 2 Apr 84) pp 752-755

PETROV, R. V. and ZHDANOV, V. M., active members, USSR Academy of Medical Sciences, KABANOV, V. A., corresponding member, USSR Academy of Sciences, KHAITOV, R. M., NORIMOV, A. Sh., KHARITONENKOV, I. G., NEKRASOV, A. V., PODCHERNYAYEVA, R. Ya., SINYAKOV, M. S. and SHCHIPANOVA, M. V., Institute of Immunology; Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] The surface antigens of influenza virus - hemagglutinin (HA) and neuraminidase (NA) - are the major antigens inducing the formation of

protective antibodies in an infected organism. However, isolated HA and NA are but weakly immunogenic and do not induce a sufficient immune response. This article is a continuation of the effort toward increasing the immunogenicity of these surface antigens. The surface antigens were extracted from highly productive recombinant strains; A/MRC-11 and R-5 isolated viral antigens were covalently bonded with nonimmunogenic synthetic polyelectrolyte, a copolymer of acrylic acid and N-vinylpyrrolidone 1:1. The height of the primary IgM and IgG antibody-forming cell response in mice immunized with isolated HA or a mixture of HA plus NA were studied to compare the height of the response to HA-CP and (HA plus NA)-CP. The conjugates were then tested as artificial vaccinating agents for the protection of mice from influenza. The experimental data indicate a basically new capability for transforming the weakly immunogenic isolated surface antigens of the influenza A virus to highly immunogenic preparations by covalent bonding with nonimmunogenic synthetic polyelectrolyte immunostimulators. Figures 4; references 15: 7 Russian, 8 Western.
[1605-6508]

UDC 577.27

CYTOTOXIC PROPERTIES OF IMMUNOTOXIN INTERACTING WITH MOUSE MYELOMA CELLS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84 (manuscript received 21 Mar 84) pp 756-759

TONEVITSKIY, A. G. and TRAKHT, I. N., All-Union Cardiologic Scientific Center, USSR Academy of Medical Sciences, Moscow

[Abstract] The purpose of this work was to produce active antibody conjugates and a ricine A-chain retaining the properties of its component parts. The model system used consisted of mouse myeloma cells P3-X63-Ag 8.653, the immunotoxin vector was MIgG fraction from rabbit antisera to these cells. The main criterion of production of an active hybrid was the presence of specific cytotoxicity, determined by the effectiveness of inhibition of the inclusion of ^{14}C-leucine in protein cells synthesized after twenty hours incubation. A simple model system was thus used to study the properties of immunotoxins containing polyclonal antibodies to tumor cells. The authors intend to develop more specific models using antibodies to known surface antigens of the target cells in the future. Figures 4; references: 15 Western.
[1605-6508]

UDC 616-092:612.017.1]-02:613.6]-07

TRIPLE ROSETTE-FORMATION REACTION - NEW METHOD FOR TESTING CELLULAR IMMUNITY MECHANISMS UPON EXPOSURE TO PRODUCTION FACTORS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 9, Sep 84 (manuscript received 14 Oct 83) pp 20-23

KHIL'KO, T. F., Institute of Labor Hygiene and Occupational Diseases, USSR Academy of Medical Sciences, Moscow

[Abstract] The triple rosette formation reaction of lymphocytes can determine the number and functional status of eight different subpopulations of lymphocytes, including the three subpopulations of B-lymphocytes and four subpopulations of T cells. Studies were performed on three groups of test subjects, including a group of occupational bronchial asthma patients, a group with occupational contact with chemical compounds but no obvious disease and a control group. The control group had the greatest number of lymphocytes with sheep erythrocyte receptors. The percent content of T-lymphocytes with C3 and IgC receptors was twice as great in the control group as in the group of healthy persons exposed to chemical factors. The reverse process was observed in the group of asthma patients. The triple rosette formation reaction can be used to identify the major immunocompetent cell populations and to determine immunoreactivity levels. Figure 1, references: 4 Western. [105-6508]

UDC 615.371:578.832.1].011.17.07

DETERMINATION OF BACTERIAL ENDOTOXIN IMPURITIES IN INACTIVATED INFLUENZA VACCINES

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian No 9, Sep 84 (manuscript received 25 Oct 83) pp 37-40

SHPILYUK, G. F., KOLOTINSKAYA, T. M., SEL'KINA, L. Ye., ZHUKOVA, T. Ya. and SHAPIRO, N. I., Leningrad Scientific Research Institute of Vaccines and Sera, USSR Ministry of Health

[Abstract] In many countries, the content of endotoxins in influenza vaccine is monitored using a highly sensitive test of gelling of Limulus po ɣphemus amebocyte lysate. The method of determining the lethal effect of endotoxin on mice treated with actinomycin D is the most commonly used test in the Soviet Union. The authors studied the possibility of using this test to determine endotoxin impurities in the stages of manufacturing whole virion and subvirion inactivated influenza vaccine, as well as finished preparations. The studies showed the possibility of using this simple and highly sensitive method to determine the residual content of bacterial endotoxin in inactivated

influenza vaccine. Bacterial endotoxin was found to be almost totally absent in the experimental series of subunit influenza vaccine. References 8: 4 Russian, 4 Western.
[124-6508]

UDC 615.371.842.14.099.076.9

ESTIMATE OF TOXICITY OF CHEMICAL SORBED TYPHOID VACCINE BASED ON PHARMACOLOGIC TEST (HEXENAL SLEEP) AND CHANGE IN MASS OF THYMUS OF WHITE MICE

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 22 Nov 83) pp 58-61

SHEREMET'YEV, N. N., Tashkent Scientific Research Institute of Vaccines and Sera

[Abstract] A study is made of the possibility of using the hexenal test and measurement of the change in weight of thymus of test mice to estimate the toxicity of chemical sorbed typhoid vaccine in the preclinical study stage. During a planned preventive vaccination project it was found that one series of four had the highest overall and local reaction rate among vaccinated subjects. The total postvaccination reactions including elevated temperature, malaise, headache, nausea and muscle pain were counted daily, local reactions determined from the presence of hyperemia, infiltrate up to 2.5-5 cm or larger or painfulness at the vaccination site. The laboratory studies of the same vaccine showed that all four series had a stressor effect, though the one that produced the largest number of human reactions also produced the greatest reactions in the laboratory tests with mice. The laboratory tests were thus found to be a reliable gauge of the reactivity of the vaccine. References 8: 6 Russian, 2 Western.
[124-6508]

UDC 615.371:578.833.26].03.015.46

POSSIBILITY OF USING CONCENTRATED VACCINE AGAINST TICK ENCEPHALITIS TO IMMUNIZE DONORS TO PRODUCE A SPECIFIC IMMUNOGLOBULIN

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 14 Jun 83) pp 71-74

SUBBOTINA, L. S., BELYAVSKAYA, N. A., MATYUKHINA, L. V., KOPYLOVA, L. M., KULCHITSKAYA, T. I., LYTAYEV, A. P., RUDAKOV, V. A. and KONONOVA, V. P., Scientific Research Institute of Natural Focus Infections, Omsk

[Abstract] A study is presented of the possibility of using concentrated vaccine against tick-borne encephalitis to immunize donors. The major areas of study include the immune response with the most economically suitable immunization system of donors, effectiveness of immunization of frequent donors, determination of optimal frequency of taking of blood from donors and possibility of repeated taking of blood from donors after completion of immunization. A new culturally purified, inactivated, dry, concentrated vaccine against tick-borne encephalitis was found to be usable for immunization of donors in order to produce immune serum for the production of antiencephalitis immunoglobulin. The most economically justified immunization scheme consists of two doses of 0.5 ml vaccine each at an interval of six months. It is possible to form groups consisting of donors who regularly give blood for vaccination. Optimal time to give blood is three weeks after immunization for those who give blood regularly, two weeks afterward for those who are giving for the first time. Blood can be taken again without additional immunization two months after the first time. The antibody titer remains at a high level over this period. Additional vaccinations six months after completion of immunization significantly increases the antibody titer and allows the production of active immune materials. References 12: 10 Russian, 2 Western.
[124-6508]

UDC 616-092:612.017.1]-021.5-092

CORRECTION OF SECONDARY IMMUNOLOGIC INSUFFICIENCY WITH YEAST RNA

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 10 Feb 83) pp 77-82

ZEMSKOV, A. M., ZEMSKOV, V. M. and PEREDERIY, V. G., Voronezh Medical Institute

[Abstract] The immunomodulating properties of yeast RNA have been revealed in recent years. Although the effectiveness of the immunomodulator has been established, the questions of optimal doses, courses of treatment and duration of preservation of positive effect remain open. The reason for the

selective influence of RNA on individual immunity characteristics is also unknown. This article attempts to answer these questions by analyzing the data from examination of 137 rheumatism patients, 60 chronic alcoholics and 145 ulcer patients. In all three of these diseases, secondary immunologic insufficiency appears, characterized by a quantitative shortage of T-helper and suppressor lymphocytes. The use of sodium nucleinate once per day or in cycles corrects the quantitative insufficiency of T-cells and results in persistent remission. In ulcer patients a direct correlation has been established between the concentration of RNA in the plasma and the immunodeficit, as well as a reverse correlation with the content of nucleic acids. Figures 5; references 12: 18 Russian, 2 Western.
[124-6508]

LASER EFFECTS

LASER BEAM THERAPY

Moscow MOSCOW NEWS WEEKLY in English No 12, 1985, p 10

[Article by Viktor Adamenko, candidate of physical and mathematic sciences: "Laser Beam Cures"]

> [Text] Isn't it a tempting proposition to control cell division of a living organism, reorganizing it into new tissues for replacing those hit by illness? And do it without extremely complicated operations, with a customary anesthesia, dispensing with miraculous chemical preparations? It is unbelievable. However, scientists have found a way of intervening in the internal workings of cells, giving them "commands" in their "language." This language is electromagnetic waves, light quanta by means of which it is possible to regulate the rate of the cells' division, their development and recovery.

What If a Tumor Is "Boiled Out"?

The invention of lasers has opened up new possibilities for treating various diseases. And, of course, an attempt has been made to employ powerful lasers to fight tumors, in particular, malignant tumors, a prominent disease at present. A surgeon's scalpel has been replaced by a laser beam. But laser surgery of tumors has not received wide application mainly due to the complexity of the operation itself. It is easier to cut out a tumor with a knife. But what if a surgeon tries to dispense with an operation in the common sense of the word?

Many years ago a German physicist, K. Weizsäcker, put forward an idea to treat concer by giving a patient his own blood transfusion, the blood being heated to about 40°C (it is common knowledge that cancer cells perish at a slight rise of temperature). However, this is technically difficult to carry out. But what if a tumor itself is heated by a powerful laser beam? True, the question arises how to reach tumors of internal organs. In certain cases, scientists have managed to overcome this difficulty.

Endoscopes have now been in use in world medicine for quite a while. They are devices for illumination and visual examination of hollow internal organs, for example, the gastroenteric tract. It is through endoscopes that doctors have started to treat tumors of the internal organs with a laser beam. A

power of 40-60 watts is used for irradiation. Through a light conduit the laser beam heats a tumor, for example, in the stomach, which results in its becoming burnt out or coagulated. The tumor is "boiled out," as it were, then it decomposes and leaves the organism by itself. The "operation" itself is painless for the patient. There is no need for anesthesia.

Powerful laser endosurgical units are gaining ever wider application in many countries. They are used for treating benign tumors of the gastroenteric tract. Very promising results have already been obtained in treating initial forms of cancer, in concert with other treatment. Recently, with the aid of a home-made unit of this kind, Soviet scientists have achieved good results in treating duodenal ulcers and various tumors.

One more very important thing: after a concer tumor is exposed to a powerful laser radiation, the possibility of the development of metastases noticeably drops....

Traces Lead To..... DNA

Until recently, many scientists have been of the opinion that the effect of electromagnetic energy on biological structures boils down exclusively to their heating. At present, Soviet scientists have established that electromagnetic waves of nonthermal intensity with low levels of quanta energy (for example, of a millimeter wave band) can affect the regulation of functions of a cell. In this connection the question arises--does heat alone cause elimination of cancer cells, making tumors vanish when exposed to a powerful laser? After all, a laser unit generates the same electromagnetic waves....

To diminish the possibility of developing metastases: this in itself is a tremendous success for medics in fighting the terrible disease. But what kind of curing mechanism does laser treatment contain? The answer was an unexpected one. Its curing mechanism is.... low power.

The healing properties of a low-power laser radiation (several tens of milliwatts only) were discovered by Soviet scientists as far back as the end of the sixties. The action of low-power lasers producing no heating of tissues is extremely effective in treating wounds, trophic ulcers and other diseases.... However, there was no convincing research data on the mechanism of laser biostimulation.

Professor Nikolai Gamaleya, head of the department of biological and antitumoral action of lasers at the Institute of Oncology Problems of the Ukranian USSR Academy of Sciences, and his colleagues E. Shishko and Yu. Yanish have put forward the idea that cells of animals and man contain a special system of photoregulation which is similar to those existing in plants and bacteria.

In experiments on cellular models, one of which was made up of human and animal blood cells, scientists discovered the following: cells react to an

extremely small dose of laser radiation of the red spectrum by changing permeability of their membranes for a number of substances. To cause such a reaction in a cell, it is enough to subject it to a radiation intensity of 0.5 watts per square meter for 15 seconds. Further investigations have shown that it is possible to change permeability of cellular membranes not only by means of laser radiation, but also by a conventional red light having a wave length of 6330 angstroms (1 angstrom equals 10^{-8} cm). Similar effects have been produced by waves of other lengths: in green and violet spectral regions, the greatest changes in a cell being observed in the violet region, and the least changes in the red one.

In other words, different colors affect differently the activity of a living cell. The studies carried out by N. Gamaleya and his colleagues have established for the first time that any cells of mammals, i.e., blood, liver or skin cells, are sensitive to a very weak luminous flux and this sensitivity has its maximums in the red, green and violet spectral regions.

It has long since become a tradition to think that light is perceived only by the eye cells. However, it turns out that all the cells are light-sensitive, the eye cells having a maximum sensitivity. But what connection does laser biostimulation have to it? The scientists from Kiev focused on the fact that the cells irradiated by the red, green or violet light discharge some substance into the medium where they are developing. The result of the research was unexpected. This substance turned out to be... DNA. Yes, that very two-spiral DNA which is a carrier of the genetic code. The scientific press once published brief, almost forgotten reports that DNA itself can stimulate certain biological processes. Experiments have convinced the scientists from Kiev that DNA discharged by the cells after they are irradiated by a low-power laser changes the mitotic activity of the cells themselves, that is, the rate of their division. That is why the laser radiation causes the cells to divide intensively, thus speeding up the healing of wounds and trophic ulcers.

However, the research carried out by the Kiev scientists has only opened a little way into an unknown world of laser therapy. Enigmas of mysterious transformations of the cell under the action of light quanta have by no means been solved yet. What kind of information is coded in a light signal? Why do cells change their behavior, reacting to a weak laser light?

While scientists are searching for the answers to these questions, medics are widely using low-power lasers instead of administering medicines. Physicians working in the field of oncology are often faced with a great number of post-operation complications: stitches start coming apart, inflammatory processes are going on. Specialists at the All-Union Oncologic Research Center of the USSR Academy of Medical Sciences have been using endoscopes for several years now for irradiation of internal organs of patients with light produced by low-power lasers. Gastric and duodenal ulcers, aftereffects of surgical interventions into a carcinoma of the esophagus and stomach are completely cured during several 3- or 5-minute sessions of treatment by nonthermal laser radiation.

As to the use of low-power lasers for treating malignant tumors, it should be noted that so far scientists possess only experimental data obtained from animals that low-intensity laser radiation retards the development of tumors. But we can assert even now that lasers are making a valuable contribution to a complex therapy of oncologic cases and this contribution is growing every year.

CSO: 1840/303E

UDC 617-001.4-02:615.849.19

HEALING OF CARBON DIOXIDE LASER WOUNDS

Moscow ARKHIV PATOLOGII in Russian Vol 46, No 9, Sep 84
(manuscript received 20 Apr 84) pp 48-56

GALANKIN, V. N. and BOTSMANOV, K. V., Department of Pathologic Anatomy (headed by corresponding member of the USSR Academy of Medical Sciences, Professor V. V. Serov), First Therapeutic and Sanitary Hygienic Faculties, First Moscow Medical Institute imeni I. M. Sechenov; Department of Pathologic Anatomy (headed by academician, USSR Academy of Medical Sciences, D. S. Sarkisov), Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences.

[Abstract] Experiments were performed on rats from which sections of tissue were excised by a focused carbon dioxide laser beam under nembutal narcosis. Both internal operations on the liver, kidney and lungs and surgical treatment of burns of the skin were performed. It was found that the wounds can heal without the phase of leukocytic dissolution of necrotic tissue. The resorptive function in these cases is performed by the macrophage system. Healing in this case is by first intention. The process of healing of wounds may include a phase of leukocytic dissolution of necrotic tissue. In this case, healing is by second intention. Figures 4; references 21: 15 Russian, 6 Western.
[071-6508]

UDC 617-001.4-002.3-085.849.19

MORPHOLOGY OF PURULENT WOUND TREATED WITH CARBON DIOXIDE LASER

Moscow ARKHIV PATOLOGII in Russian Vol 46, No 9, Sep 84 (manuscript received 28 Oct 83) pp 56-62

YELISHEYENKO, V. I., SKOBELKIN, O. K. and BREKHOV, Ye. I., Fourth Main Administration, USSR Ministry of Public Health

[Abstract] The morphology of healing of purulent wounds treated with a CO_2 laser was studied in 405 patients with purulent wounds, abscesses, phlegmons, carbuncles, furuncles, purulent cysts, trophic ulcers, whitlows, purulent bursitis and soft tissue fistulas. The CO_2 laser surgery consisted of removal of nonviable tissue, with suturing or dermoplasty and subsequent drainage, washing and active aspiration. Histologic pictures of some of the wounds following laser treatment are presented. Morphologic study of bioptates in various stages of healing after necrectomy indicated that recovery is similar to healing of a clean surgical wound. This results from the aseptically productive nature of inflammation and absence of leukocytic infiltration of granulation

The use of the CO_2 laser for treatment of purulent wounds helps to clean them, stimulates regenerative processes in them and reduces the time of treatment of patients. Figures 3; references 14: 13 Russian, 1 Western.
[071-6508]

ROAD TO LASER AGRICULTURAL PRACTICES

Alma Ata KAZAKHSTANSKAYA PRAVDA in Russian 1 Mar 85 p 3

INYSHIN, V., chairman of section "Bioenergetics" at the commission on assistance to USSR Food Program, honored inventor of KazSSR, doctor of biological sciences, professor, and IL'YASOV, G., candidate of biological sciences, agronomist

[Abstract] Prospects of use of new methods of laser agrotechnology, developed at Kazakh State University to increase farm crop production, are discussed. Use of the laser techniques to activate wheat seeds and results of use of these seeds in various regions are described. The economic impact from efficient use of the laser technique on different farms was presented. The need for training specialists and practitioners to use the technique properly and the importance of development of organizational and administrative bodies to oversee introduction and implementation of the laser agrotechnical methods are discussed.
[287-2791]

LASER THERAPY IN PLANT HEALTH CLINIC

Moscow LENINSKOYE ZNAMYA in Russian 10 Mar 85 p 3

KORSHUNOVA, N.

[Abstract] M. M. Chemnyy, associate of departments of industrial disease of Moscow Oblast Executive Committee imeni Vadimirskiy, candidate of medical sciences, discussed the use of laser therapy in treating industrial diseases involving the peripheral nervous system and neuromuscular apparatus. He discussed the etiology, symptoms, laser treatment procedure and results of the use of the UFL-01 [general-purpose laser physiotherapeutic device] in treatment of vibration disease and pathology resulting from contact with ultrasound, at Podol'sk Health Clinic. He described similarities and differences found in patients with these diseases and pointed out the importance of individual differences in resistance to these diseases. He reported improvement (elimination or lessening of symptoms) in 120 of 140 patients treated by this laser procedure with 50 percent improvement being considered good when conventional treatment is used. He reported that there were no significant side effects in 8 years of using lasers to treat industrial diseases and mentioned only high intraocular pressure as an absolute contraindication of use of the procedure.
[290-2791]

MEDICINE

UDC 615.849.1:378.661

TEACHING MEDICAL RADIOLOGY TO FOREIGN STUDENTS

Moscow MEDITSINSKAYA RADIOLOGIYA in Russian No 2, Feb 85 pp 46-49

[Article by V. N. Kochergin, V. Yu. Domanskiy, Yu. K. Sorokin, and V. A. Shevchenko, Kalinin Medical Institute, RSFSR Ministry of Health]

[Text] Medical specialists for foreign countries have been trained at Kalinin Medical Institute since 1962. Students, residents and graduate students from 34 nations, primarily from Asia, Africa and Latin America, are studying at therapeutic and stomatology faculties at the present time.

We have kept in mind two groups of problems while improving the training of foreign roentgenology and medical radiology students: 1) special characteristics of the contingent and 2) approximating the instruction to future work activity conditions of the students. Differences in the secondary education system and in philosophical concepts as well as language difficulties are among special characteristics of the contingent. The second group of problems includes the specific nature of the content of course subjects. The goal also is to prepare not only highly skilled and erudite physicians, honorably bearing the stamp of Soviet VUZ graduates, but also true friends of our country, active warriors for peace and progress.

We are conducting instruction of Soviet and foreign students according to unified study plans and programs, in unified study groups. Twelve hours of lectures and 24 hours of practical studies are allocated for teaching medical radiology during the sixth semester at the therapeutic and a seventh semester at the stomatology faculties.

In the presence of foreign students we pay special attention in lectures and practical studies to questions enabling emphasis on the advantages of the socialist structure and the importance and significance of the Great October Conquest. We emphasize the cost-free nature and accessibility of medical care and the equal opportunities presented for the treatment of all USSR citizens, regardless of their social position and racial or national affiliation. We discuss the achievements of Soviet science and practical public health in the development of radiation therapy and radionuclide diagnostics and in the use of the newest achievements in physics and technology in the campaign to preserve the lives and health of the Soviet people.

We attach a great deal of importance to discussion of questions of deontology and physicians' ethics and emphasize the humaneness of the Soviet public health principles. We also call the attention of foreign students to social programs implemented in the USSR on the basis of CPSU congress resolutions, directed at raising the material standard of living and fortifying the physical health and satisfying the spiritual requirements of Soviet citizens.

As one of its basic steps, the procedure for conducting practical studies includes work with teaching programs put together in the form of reference principles for students' work based on an analysis of disease history, on formulation of a cancer patient radiation therapy plan, and also on setting up the routing of patients to radionuclide diagnostic testing and on clinical evaluation of their results.

Such a procedure, oriented toward the practical application of principles of the theory of step-by-step formulation of mental actions makes it possible for the overwhelming majority of students to attain the final goal of their studies. For example, the coefficient of useful effect of the practical study on the subject "Principles of Radiation Therapy; Contact Methods of Radiation Therapy" was 0.73.

In order to overcome difficulties of a linguistic nature and also those connected with differences in starting knowledge, "Summary Outlines for Foreign Students" were developed to fit all subjects of the medical radiology course. They are structured in the form of short responses to questions and contain the basic positions of nuclear physics and radiobiology and also include formulation and terminology from the medical radiology course. The manual is put together on the question-answer principle; when possible, the material presented is in the order in which it is to be presented in a lecture or practical lesson.

Let us give some examples:

a) On the subject "Principles of Radiation Therapy; Contact Methods of Radiation Therapy":

Answer (A): Corpuscular Radiations: protons, alpha-particles, electrons, neutrons, negative pi-mesons;

Quantum (photon) Radiations: braking and gamma radiation (Sec. 10.1--here and hereinafter are shown the sections in the textbook "Medical Radiology" by L. D. Lindbraten and F. M. Lyass, Moscow, 1979, in which a detailed answer to this question can be found).

Q. Give a definition of the therapeutic radiosensitivity level..

A. This is the difference in radiosensitivity between a tumor and the tissues surrounding it (Sec. 12.2.2).

Q. What important features are characteristic of contact methods of radiation?

A. The absorbed dose maximum is found in the tissues adjacent to the preparations, and decreases abruptly in proportion to its distance from the source. In the process of treatment, the preparations are distributed on the surface or interior of the patient's body (Sec 11.2).

b) On the topic of "Scanning and Scintigraphy."

Q. How does the segment of an organ not absorbing RFP [expansion unknown] appear on the scanogram?

A. As the portion of the scanogram (scintigram) with the least "density" or lack of striation (Sec. 1.3.4).

We recommend the summary outlines to foreign students for independent study. In our opinion, they help to sort out what is important in the study material and to overcome not only difficulties of a language nature but, to a definite degree, an insufficient general education preparation. Working with the summary outlines contributes very significantly to raising the starting level of knowledge in preparing students for their occupation.

A handbook "Reference Materials in Medical Radiology for Foreign Students" has been created in the department, in order to bring instruction close to future work conditions of foreign students. It includes the following sections:

a. Radiation Therapy

1. Data on oncological morbidity in various countries.

2. Organization-procedural and economic questions of radiation therapy;

- requirements for radiation therapy under conditions in developing countries;

- organization of a radiation therapy service;

- cost of radiation therapy and chemotherapy;

- equipment for performing radiation therapy;

- technical maintenance and dosimetric control.

3. Data on the use of radiation therapy for the treatment of various oncological diseases in countries of the world.

b. Radionuclide Diagnostics

1. Organization of a radionuclide diagnostics service in foreign countries.

2. Foreign radiodiagnostic apparatus.

3. Foreign RFP [expansion unknown].

4. New methods of radionuclide diagnostics, developed in our country and abroad.

5. Cost of radiodiagnostic studies.

6. Requirements for radiodiagnostic studies in various countries.

Reference materials in the form of brochures from foreign companies, data from foreign literature (we also enlist foreign students for translating these into Russian), etc., are filed in cardboard folders, making it possible to introduce new data to all sections without destroying the structure of the procedural guide.

The reference materials included in the manual are put at the disposal of foreign students in practical studies, during consultations and for independent study. They are also used by teachers for direct selection of patients treated by foreign students.

Let us present an example.

"Reference Materials in Medical Radiology for Foreign Students" includes a table "Share of Specific Cancer Localizations in Cancer Registers for Several Countries," taken from the collection "Optimization of Radiation Therapy." Report of WHO Scientific Conference 644 (Geneva, 1982, p 10).

The data presented in the table help instructors in the purposeful selection of patients for treatment: for students from India it is completely natural that these will be primarily patients with neoplasms of the oral cavity and digestive tract, for Iraqi students--the bladder, for Peruvians--digestive tract and female reproductive organs, etc.

In practical studies when patients are allocated to foreign students for treatment, it is suggested to them that they use reference materials to determine the most frequently encountered localizations of malignant tumors in their region and that they choose a patient for treatment based on this. Next, during the selection of treatable patients, questions of cancer epidemiology are discussed briefly, and we call the attention of the foreign students to a possible high rate in their countries of cancer cases with these localizations, for which radiation therapy is primarily indicated. This is an additional factor for the motivation of cognitive activity in foreign students while studying radiation therapy.

It is appropriate to note here that in proportion to their knowledge of medical radiology, certain foreign students express a wish to study a specific section in detail and to acquire definite practical skills. From conversations with

Table. Share of Specific Cancer Localizations in Cancer Registers for Several Countries, %

Tumor Localization	England	India	Iraq	Liberia	Peru	Thailand
Oral Cavity	3.4	10.9	--	--	--	4.9
Digestive Tract	26.6	23.3	--	--	29.1	31.8
Liver	1.5	--	--	12.0	7.4	16.0
Nasal sinus, Larynx	1.0	5.9	6.7	--	3.4	1.7
Lungs, bronchi	15.8	8.0	8.0	--	7.9	8.7
Mammary Glands	11.9	4.2	7.5	5.0	8.0	6.5
Female Reproductive Organs	9.1	6.5	--	19.0	17.6	20.2
Bladder	4.1	--	10.3	4.5	1.7	1.5
Lymphoid and Blood-Producing Tissue	4.7	9.2	15.5	11.5	--	--

these students it becomes clear that they are prompted to do this because of a belief in the prestige of the physician-radiologist's specialization and in the need for using radiation therapy and radionuclide diagnostics methods in their future practical work. Use of the resources of educational-research study (ERS) in the course of the pedagogical process and participation in scientific research study by students within a circle of the student scientific society of the department are very important in the satisfaction of these requirements.

According to the ERS pattern for foreign students in the department, there is a provision for measures contributing to improvement in practical skills, taking into consideration the future work of graduates, as well as to enrichment of theoretical knowledge. We offer students additional problems in the diagnosis and treatment of diseases which approximate the work conditions of a practicing physician, and related to independent examination of a patient or radiation therapy session, i.e., study of the procedure and execution of independent marking of radiation fields in distance gamma-ray therapy,

independent calculation of radiation conditions for monopolar and bipolar statistical distance gamma therapy, processing of the results of radiography with computation of quantitative indices, etc.

A list of the subjects of abstract reports was also put together for them. It contains, for example, subjects on epidemiology of tumors in foreign countries, immuno-oncology, and new methods of radionuclide diagnostics published in foreign journals.

We also choose subjects for scientific research studies for foreign students by taking into account the nature of the future work, starting with the pathology most frequently encountered in the region where the student was for training.

We actively involve foreign students in sociopolitical and sanitary-educational activity. We make it a practice to have students speak to colleagues and patients with stories about their countries, and draw them into participation in discussions on current international problems. Students give lectures, conduct discussions with patients on sanitary-educational themes and participate in the publication of sanitary bulletins.

We give a great deal of attention to work outside of the lecture hall and individual work with foreign students. The department treats one of the fellow countrymen and the instructors regularly visit the living quarters, using all resources for training them in the spirit of internationalism, a friendly attitude toward our country, and a materialist world view.

12262
CSO: 1840/1055

IMPLANTABLE ARTIFICIAL HEARTS

Moscow PRAVDA in Russian 16 Mar 85 p 3

[Article by O. Frantsen]

[Abstract] The article reports on developments in artificial hearts at the USSR Ministry of Health, Scientific Research Institute of Transplantology and Artificial Organs. Comments of the institute's director, corresponding member of the USSR Academy of Medical Sciences V. Shumakov, are recorded regarding the latest experiments with the "Poisk" model air-driven implantable heart. Late in 1984, Shumakov and other surgeons implanted a version called the "Poisk-10" in a calf, which lived for nearly four months. This was twice as long as the previous best result with an artificial heart in a calf. Shumakov called the results a success in terms of the goal of this part of the Soviet artificial-heart program, which is to have an implantable, externally driven heart available for sustaining the life of patients while a suitable human donor heart is sought for transplantation. Asked how these developments compare with those of the American surgeon William DeVries, Shumakov replied: "The impression which arises that Soviet researchers are lagging behind is incorrect. First of all it should be clarified that the case in question involves only one type of artificial heart -- one with an external drive. Several years ago there actually was a certain lag on our part. This usually happens when research teams that are working on the same problem take turns replacing each other in the lead in one direction or another. A year ago we eliminated the gap between our experiments with this type of artificial heart and the foreign ones. It was necessary that such a heart should operate for about one month; we succeeded in making this time almost twice as long, and now it is nearly four times as long..."

Shumakov went on to say that better solutions than cumbersome external power sources for a permanent implantable artificial heart are being sought at his institute and other Soviet research organizations. In the institute's laboratory of auxiliary circulation, the author of the article was shown models of compact mechanical hearts. One called "Gerts-02" is driven by a thermal engine that uses a plutonium isotope as a power source and is carried in a backpack. Another model also powered by a plutonium isotope, "Mikron", is fully implanted in the body. Another model has a miniature electric motor which is implanted together with the mechanical heart, and the only thing outside the body is an electric battery to power the motor. This model was developed with the collaboration of the Moscow Physical-Technical Institute. It is reported that artificial hearts of these types have been tested for up to three days in animals.

FTD/SNAP
CSO: 1840/305

INDUSTRY DELAY IN ADOPTING BLOOD TECHNOLOGY DEVELOPMENTS OF INSTITUTE RESEARCH

Moscow MEDITSINSKAYA GAZETA in Russian 22 Mar 85 p 3

[Article by S. Simbirtsev, professor, president of the Leningrad Institute of Advanced Training of Physicians; N. Belyakov, Candidate of Medical Sciences, head of the department of experimental pulmonology of the institute's central scientific research laboratory (Leningrad)]

[Abstract] The authors describe blood technology developments of the Leningrad Institute for Advanced Training of Physicians, and they comment on problems of introduction of the institute's R&D results. They note that projects amounting to almost 500,000 rubles have been done in the five years that the institute has been doing contract work.

The institute's work on new and improved materials and equipment for blood research and for transfusions and perfusions reportedly has been recognized with more than 20 certificates of invention. The authors relate that blood microfilters and closed-type oxygenators for one-time use were developed with financing from institutes of the USSR Ministry of the Chemical Industry, which were interested in expanding applications of materials they had previously developed. The Leningrad Medical Polymers Plant assisted the institute in the development of perfusion microfilters and diaphragm oxygenators,

and transfusion microfilters were developed in collaboration with the Belgorod-Dnestrovskiy Polymer Medical Products Plant. The all-Union scientific research institutes of synthetic resins and medical polymers developed the diaphragms used in the oxygenators.

Filtering materials which do not damage blood components reportedly were developed with the assistance of the Leningrad affiliate of the All-Union Scientific Research and Design Institute of Synthetic Fibers.

Devices for microfiltration of blood during artificial circulation (the PMF-1) and transfusion of preserved blood (the TMF-1 and TMF-2) were developed on the basis of these materials by designers of plants and the authors' institute. Highly effective blood microfilters of the sorption type were subsequently developed. These microfilters (SMF-1) are intended for both transfusion and extracorporeal hemosorption systems.

In conclusion, the authors complain that despite the advantages of their institute's blood technology developments, not one of the devices has been put into production at medical equipment plants. Ostensibly, the reason is that plant facilities are overloaded with current items of production, and resources for new items of production are lacking. But the authors suggest that a problem of imperfect interaction between the two ministries that are directly concerned has a bearing on the situation. Organizations of the Ministry of Health, which clearly understand the requirements of new products and possess the resources for their comprehensive clinical testing, nevertheless do not have the expertise for getting their developments adopted by industry. On the other hand, developments of institutes of the Ministry of the Medical Industry have an easy road to introduction, but when they undergo extensive clinical evaluation defects often are revealed which could have been eliminated if medical specialists had a larger role in testing of prototypes.

FTD/SNAP
CSO: 1840/1839

UDC 615.462.014.45:615.28:547.281.1].033

DIFFUSION OF FORMALDEHYDE IN MEDICAL PURPOSE POLYMERIC MATERIALS

Moscow GIGIYENA I SANITARIYA in Russian No 10, Oct 84 (manuscript received 4 Apr 84) pp 77-79

LIKHTMAN, T. V., KOLESNIKOVA, N. I. and VYSHEGORODSKAYA, R. A., All-Union Scientific Research Institute of Disinfection and Sterilization, USSR Ministry of Health, Moscow

[Abstract] A study was made of the regularities of diffusion and desorption of formaldehyde over a broad range of concentrations from the minimum detectable concentration, on the order of 1 μg/g to the saturation concentration. Polymer materials employed in medical practice were used in the work: compositions based on polyvinyl chloride, plasticized dioctyl phthalate, polyethylene, natural rubber filled with carbon or chalk, silicone rubber with aerosil. The diffusion coefficient D was determined by the kinetics of elimination of the gas from the polymers with experimental conditions as close as possible to practical conditions of sterilization and degassing of the products. Results show that large quantities of formaldehyde are rapidly removed from silicone rubber, small quantities from polyethylene and polyvinyl chloride. The problem of predicting the time required for degassing of sterilized polymer products with known initial formaldehyde content can be solved in two ways: by computation using the diffusion factor or by comparison with experimental kinetic curves. Figures 2; references 6: 5 Russian, 1 Western.
[079-6508]

UDC 617-001.4-002.3-073.916

ELECTRON-RADIO AUTOGRAPHIC STUDY OF INFECTED HUMAN WOUNDS

Moscow ARKHIV PATOLOGII in Russian Vol 46, No 9, Sep 84 (manuscript received 20 Apr 84) pp 16-24

SARKISOV, D. S., PAL'TSYN, A. A., KOLOKOL'CHIKOVA, Ye. G., KAYEM, R. I. and MOROZOV, S. S., Department of Pathologic Anatomy (headed by academician D. S. Sarkisov, USSR Academy of Medical Sciences), Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences

[Abstract] One promising trend in the investigation of the wound process is the use of electron-microscopic radioautography, which allows comparison of the status of the cells of a microorganism with the specifics of microorganisms, such as rate of reproduction, viability and intensity of biosynthetic processes. This article describes results of the first electron radioautographic study of bioptates from human burn and trauma wounds. Radioautographs of bacteria in the zone of necrosis and demarcation ridge, proliferating granulation tissue

cells and autographs illustrating the relationship of synthesis of RNA with the functional status of neutrophils are presented. Among the necrotic tissue of a wound, a large quantity of nonphagocyted living bacteria can be found. Microbes are seen significantly more rarely in the demarcation ridge, and only a few individuals are seen in granulation tissue, then only in macrophages. Most of the neutrophils at the demarcation ridge perform intra- and extracellular lysis of dead tissue, manifested as the presence of a large number of phagosomes containing tissue fragments, intensive degranulation, and transparency of fibrin surrounding the neutrophils. Phagosomes with bacteria are seen only in a small number of neutrophils. Synthesis of RNA is not seen in blood neutrophils. It becomes significant in wound neutrophils phagocytizing microbes. The synthesis of RNA is particularly increased in wound neutrophils performing phagocytosis of necrotic tissue. This indicates that neutrophils have great reserve capabilities for intensifying their function, manifested in sharpest form in phagocytosis of necrotic tissue rather than microbes. Figures 4; references 26: 18 Russian, 8 Western.
[071-6508]

ULTRAVIOLET IRRADIATION OF BLOOD

Leningrad LENINGRADSKAYA PRAVDA in Russian 26 Mar 85 p 3

[Article by T. Chesanova]

[Abstract] The article is an interview with Professor L. V. Potashov, head of the chair of general surgery of Leningrad Medical Institute No. 1 imeni Pavlov, regarding findings of studies of ultraviolet irradiation of blood and its uses in therapy. The interview was given on the occasion of a conference on the 'ultraviolet phenomenon,' which was being attended by biophysicists, cytologists and optics specialists, as well as physicians.

Potashov relates that scientists of many Leningrad institutes and medical specialists are studying the mechanism of enrichment of human blood through ultraviolet irradiation. A restructuring of the main defense systems of humans has been found to occur as a result of irradiation. This stimulates the blood's defenses and heightens the organism's overall resistance to microbes and viruses, according to Potashov.

With regard to practical applications of the phenomenon, Potashov mentions a kidney-transplant case in which the irradiation method proved effective in heightening a kidney recipient's resistance to infections after she had been given preparations which suppress the immune system. He says that his clinic has opened an outpatient center where blood is taken from patients scheduled for major surgery, irradiated and returned to the patients by a procedure which takes less than 15 minutes. Ultraviolet enrichment of the blood is also being employed as a treatment for sepsis and other inflammatory processes. Potashov notes in conclusion that a blood-irradiating unit has been developed at the State Optics Institute. This instrument was awarded a gold medal of the USSR Exhibition of Achievements of the National Economy, and it is scheduled to go into serial Production in Yerevan.

FTD/SNAP
CSO: 1840/305E

MICROBIOLOGY

UDC 576.8.095.84:543.4

CHANGE IN OPTICAL DENSITY OF BACTERIA SUSPENSIONS UPON CHEMOTAXIS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 279, No 2, Nov 84
(manuscript received 21 May 84) pp 488-491

ZAVAL'SKIY, L. Yu., SVETOGOROV, D. Ye., BREZGUNOV, V. N. and POPOV, V. G.,
All-Union Scientific Research Institute of Applied Microbiology, Obolensk
(Serperkov Rayon, Moscow Oblast)

[Abstract] An attempt is made to relate changes in optical density of a bacterial suspension to orientation effects in a gradient of a chemoeffector. The major kinematic manifestation of chemotaxis in bacteria is considered to be differences in path length with and against the gradient. The major hypothesis of the work is that bacteria having anisotropic form are oriented in straight line sections of their movement relative to the direction of movement. Asymmetry in path lengths should be equivalent in the mean static value to a certain orientation effect. Orientation of cells of anisotropic shape may be one reason for a change in optical density. For such bacteria as E. coli, the optical effect reaches several percent and is quite easily observable in experiments. References 13: 8 Russian, 5 Western.
[1625-6508]

UDC 579.842.14.086.2

ULTRASTRUCTURE OF UNBALANCED GROWTH FORMS OF SALMONELLA OBTAINED UPON EXPOSURE TO VARIOUS FACTORS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 16 Nov 83) pp 50-54

KATS, L. N., ZIGANGIROVA, N. A., KONSTANTINOVA, N. D. and PROZOROGSKIY, S. V.,
Institute of Epidemiology and Microbiology imeni N. F. Gamalaya, USSR Academy
of Medical Sciences, Moscow

[Abstract] The purpose of this work was to determine the possibility of producing imbalanced growth forms upon exposure to ultraviolet rays and immune

factors, i.e., agents which are not immediately directed toward synthesis of peptidoglycane, and also to study the submicroscopic organization and method of reproduction of these forms in comparison to penicillin forms. The sudies involved six strains of S. typhimurium. Bouillion salmonella cultures were taken into the experiment during the logarithmic phase of growth. The imbalanced growth forms were monitored in a light microscope with a phase contrast device. Their structure was studied by ultrathin sections in an electron microscope. Penicillin, homologous antiserum, complement and lysozyme were studied as well as UV radiation. Imbalanced growth forms were produced upon exposure to penicillin, a combination of immune factors and UV radiation, though with the latter two factors most of the cells in the population are irreversibly damaged. Imbalanced growth forms resistant during long passages and converting to L forms were produced only upon exposure to penicillin. Elementary bodies are formed both with the imbalanced life forms not yielding the L forms in subsequent passages as well as with forms which do yield the L forms. The viable portion of the population of imbalanced growth forms obtained in all cases has damaged mucopeptide wall layer, some damaged cytoplastic membrane and related damage to the process of cell division.
Figures 5; references 9: 7 Russian, 2 Western.
[124-6508]

UDC 579.8.083.13(049.32)

CONTROL OF THE PROCESS OF CULTIVATION OF MICROORGANISMS

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 p 118 (Review of Upravleniye Protsessami Kul'tivirovaniya Mikroorganizmov, by BLOKHINA, I. N., OGARKOV, V. I. and UGODCHIKOV, G. A., Gor'kiy, 1983, 176 pages)

ZHDANOV, V. M., academician USSR Academy of Medical Sciences, Reviewer

[Abstract] The monograph here reviewed generalizes knowledge accumulated to date and develops the mathematical theme of the growth and development of microbial populations in artificial media, the control of these processes and the design of automatic systems for the purpose. The authors base their presentation on the representation of microbial population as self-regulating systems under artificial conditions in the biotechnological process. Particular attention is given to limiting factors in the growth of a given population under given cultivation conditions, as well as inhibiting factors which are formed in the process of the vital activity of the microbe population. The central portion of the monograph is the use of methods of systems analysis to model the reproduction of microorganisms in cultures and to solve problems of optimal control of these processes. This is an original concept by the authors of the monograph. The book is evaluated by the reviewer as original and useful for all working in the area of biotechnology of microorganisms.
[124-6508]

MILITARY MEDICINE

ARMY MEDICAL RESEARCH ON AFGHANISTAN CLIMATE

Moscow KRASNAYA ZVEZDA in Russian 5 Apr 85 p 4

[Text] Man in extreme environments--this describes in brief the main topic of research which is being conducted by Colonel of Medical Services A. Novitskiy, doctor of medical sciences and professor, and his subordinates. Novitskiy is head of a laboratory of the chair of military field therapy of the Military Medical Academy imeni Kirov.

Laboratory associates who are studying effects of the arid mountain climate on the human body are doing their research in many southern regions of the country, and also in the Democratic Republic of Afghanistan.

(A photograph shows Novitskiy and Major of the Medical Services V. Kuzenkov, senior science associate and condidate of medical sciences, in the laboratory.)

FTD/SNAP
CSO: 1840/304E

MOLECULAR BIOLOGY

UDC 539.199:577.352.462

STUDY OF MOVEMENT OF WATER MOLECULES IN IONIC CHANNEL BY MOLECULAR DYNAMICS METHOD

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 1, No 9, Sep 84
(manuscript received 7 Dec 83) pp 901-912

AYT'YAN, S. Kh. and CHIZMADZHEV, Yu. A., Institute of Electrochemistry imeni A. N. Frumkin, USSR Academy of Sciences, Moscow

[Abstract] The molecular dynamics method is used to study the movement of water molecules in an ionic channel. The model selected includes the major features of a gramicidin-like channel but contains a number of simplifications. The gramicidin channel was selected as the best studied and for its structural simplicity. The ST2 model of Stillinger and Rahman is used in which water is considered to be a tetrahedron, two points of which, corresponding to the hydrogen atoms, carry charge Q_W, while the other two points, corresponding to the scattered oxygen atom charge, carry a charge of $-Q_W$. The water molecules in the channel have no rigid spatial structure but do have orientation structure, rotated in the direction of the channel axis. The water molecules move smoothly in the channel, having no deep and stable potential holes. The dipole moment of the water molecules in the narrow channel cause the primary orientation in the direction of the axis, causing the structure of the water in the channel to differ from the structure of water in free space, though it is still in the liquid state. Figures 11; references 16: 1 Russian, 15 Western.
[126-6508]

JPRS-UBB-85-018
28 June 1985

UDC 547.963.32:577.213.3

MUTAGENESIS DIRECTED BY OLIGONUCLEOTIDES. INTRODUCTION OF POINT MUTATIONS (TRANSITIONS, DELETIONS, INSERTIONS) IN BETA-GALACTOSIDASE GENE

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 281, No 2, Mar 85 (manuscript received 11 Apr 84) pp 476-481

PETRENKO, V. A., SEMENOVA, L. N., SIBOLOBOVA, G. F., GUTOROV, V. V. and KARGINOV, V. A., All-Union Scientific Research Institute of Molecular Biology, Kol'tsovo Settlement, Novosibirsk Oblask

[Abstract] A model system was developed to permit reliable testing of mutations induced by oligonucleotides and its use for a thorough study of the method of localized mutagenesis. The system includes derivatives of DNA phage M 13mp1 and oligonucleotides and incompletely complemented DNA sequences in the beta-galactoside gene. The universality and high effectiveness of use of the method of site-specific mutagenesis was shown. The mutants yield in most experiments was near to 10 percent, which facilitates detection of mutant colonies by hybridization of DNA with oligonucleotide mutagen. In some cases the mutants' yield approximated the theoretical level of 50 percent. In the study, directional introduction of a nucleotide insertion into DNA was achieved for the first time. The M13 phage obtained and the oligonucleotides synthesized can be used in the laboratory to study the specificity of effect of chemical mutagens and endonucleases of BamHI and DNA of M13mpB for cloning DNA fragments. Figures 4; references 13: 2 Russian, 11 Western. [1820-2791]

NONIONIZING ELECTROMAGNETIC RADIATION EFFECTS

UDC 57.047:613.167

MANIFESTATION OF NATURAL FREQUENCY CHARACTERISTICS OF HUMAN BODY

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 10, Oct 84 (manuscript received 23 Jul 84) pp 60-63

ANDREYEV, Ye. A., BELYY, M. U., corresponding member, Ukrainian SSR Academy of Sciences, and SIT'KO, S. P.

[Abstract] The purpose of this work was to determine skin surface areas most effective for therapeutic application of local electromagnetic field radiation in the 3 to $8 \cdot 10^{10}$ Hz frequency range at very low power levels. Electromagnetic oscillators radiating up to 8 mW were used to irradiate the surfaces studied through a horn antenna at a distance of 5-20 mm from the skin surface. Tests about thirty minutes long were performed on 188 subjects. Healthy subjects did not react to local irradiation at 27-28 GHz, current density up to 10 mW/cm^2. A sensory reaction was evoked at 45-65 GHz in certain patients, in that a sense of heat or pressure was felt in a diseased organ located at some distance from the area irradiated. Whole body reactions included mild euphoria or sleepiness. The sensory response was frequently very rigidly associated with a definite frequency. Increasing or decreasing frequency by less than 1% resulted in disappearance of the sensory reaction. Areas of the body known to be acupuncture zones were most sensitive to electromagnetic radiation. Figures 3; references 16: 9 Russian, 7 Western.
[1616-6508]

MAGNETIC BALNEOLOGY

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 14 Nov 84, p 4

KOSTIN, V., Vitebsk

[Abstract] The author discusses the use of magnetic baths at a sanatarium in Sochi. It is reported that experiments have shown that drinking of magnetized water increases the permeability of biological membranes in tissue cells, decreases the quantity of cholesterol in the blood and liver, regulates arterial

pressure, increases metabolism and helps in the elimination of small stones in the kidneys. Magnetized water has also been found useful in the treatment of eczema and various skin diseases. Since magnetized water has a normalizing effect on disordered cholesterol metabolism in atherosclerosis and has a positive influence on the course of the disease, a number of scientists recommend drinking it for both preventive and therapeutic purposes. Magnetized sea water is particularly helpful, since the higher salt content helps to increase effectiveness of the water.
[103-6508]

UDC 613.168

HYGIENIC STANDARDIZATION OF ELECTROMAGNETIC RADIATION IN DAILY LIFE

Moscow GIGIYENA I SANITARIYA in Russian No 10, Oct 84 (manuscript received 16 May 84) pp 20-23

DUMANSKIY, Yu. D., NIKITINA, N. G., TOMACHEVSKAYA, L. A. and KOCHERGIN, S. M., Kiev Scientific Research Institute of General and Communal Hygiene imeni A. N. Marzeyev

[Abstract] Commercial domestic microwave ovens and induction ovens were used as sources of radiation for experimental electromagnetic irradiation of white rats. The functional status of the animals was evaluated based on physiological, biochemical and immunologic indices recorded each month with exposure to the microwave energy with a flux density of 10, 100 or 1,000 $\mu W/cm^2$, electric field of 0.5, 1 or 5 kV/m and an alternating magnetic field of 0.4, 4 or 40 A.m. The studies revealed a decrease in working capacity and level of motor activity of the animals with microwave fields of 1,000 and 100 $\mu W/cm^2$ and the magnetic field of 40 A/m. Maximum permissible levels of electromagnetic radiation are recommended as 10 $\mu W/cm^2$, at low frequencies, electric component 0.5 kV/m, magnetic component 4 A/m.
[079-6508]

UDC 576.354:612.014 42

INFLUENCE OF MAGNETIC FIELDS ON DIVISION OF SOMATIC PLANT CELLS

Kiev TSITOLOGIYA I GENETIKA in Russian Vol 18, No 5, Sep-Oct 84 (manuscript received 11 Feb 83) pp 339-343

CHASTOKOLENKO, L. V., Scientific Research Institute of Biology and Biophysics, Tomsk State University

[Abstract] Plants were exposed to the field of a permanent magnet for 1, 2, 3 hours, 1, 2, 3 days and one year. Subsequent generations of plants were grown

in the field for several years. The mitotic activity was determined in the cells of leaves and stems, qualitative and quantitative composition of anomalies in anaphases and telophases of mitosis were determined and cytopathology was investigated in other phases of division and in the interphase. It was found that treatment of seeds before planting altered the rhythm of mitosis in the somatic tissues of the plants and simultaneously increased the number of anomalous cells. The alterations were preserved for several generations. References 26: 16 Russian, 8 Western.
[073-6508]

UDC 616.33/.34-053.2-089.84:615.847.8

USE OF PERMANENT MAGNETS IN DIGESTIVE TRACT SURGERY IN CHILDREN

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 9, Sep 84 (manuscript received 18 Dec 83) pp 6-11

STEPANOV, E. A., VASIL'YEV, G. S., SHARIPOV, N. A., RUDAKOV, S. S., ROMAKHI, Yu. A., GERBERG, A. N., BARINOV, G. M., MUKHO, S. B., SHABANOV, A. M. and LUBASHEVSKIY, V. K., Moscow

[Abstract] A number of magnetic devices have been suggested for use in digestive tract surgery including magnetic colostoma obturators, devices for sutureless joining of digestive tract organs, and circular magnets for resection of the large intestine in children. Animal experiments have demonstrated the promise of such devices. The new devices avoid the inflammatory reaction to sutures. After healing is complete and the portion of intestinal tissue squeezed between the rings breaks away, the magnetic rings and necrotic tissue are eliminated with the stool. Similar devices were used for elimination of strictures of the esophagus. Extraabdominal resection of the large intestine with permanent magnets allows a colorectal anastomosis to be inserted at 5 to 6 cm from the anus, making it the operation of choice for resection of the large intestine in children at this level. Figures 2; references 22: 11 Russian, 11 Western.
[074-6508]

JPRS-UBB-85-018
28 June 1985

UDC 612.017.1+615.846

EFFECTS OF DECIMETER WAVES ON IgG HEMOLYSIN-PRODUCING CELLS IN GUINEA PIGS

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 1, Jan-Feb 85 pp 25-27

YEVSTROPOV, V. M., KOVALEVA, G. V. and PORYADINA, I. N., Immunology Laboratory, Kirghiz Scientific Research Institute of Health Resort Science and Physical Therapy

[Abstract] The effects of decimeter wave-irradiation on splenic antibody response was studied in guinea pigs irradiated in the thymic/thyroid projection and immunized with sheep RBCs. Irradiation (80 mW/cm^2 power flux density; 10 min/day for 5 days) before immunization (10^9 sheep RBC i.p.) resulted in an increase in IgM producing cells versus control counts, while irradiation after immunization depressed the IgM response. Analysis of the IgG producing cells showed uniform depression in comparison with control data, regardless of the time of irradiation. The mechanism responsible for the preferential formation of IgM hemolysin in the irradiated animals may either concern suppression of the IgG-producing cells, interference with the IgM-toIgG shift, or involve both factors.
[276-12172]

PHARMACOLOGY AND TOXICOLOGY

UDC 577.152.311.042:547.464/465

ANTICHOLINESTERASE ACTIVITY OF FLUOROCHLORONITROACETIC ACID ESTERS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 279, No 2, Nov 84 (manuscript received 23 Apr 84) pp 506-508

IVANOV, Yu. Ya., BREL', V. K. and MARTYNOV, I. V., corresponding member, USSR Academy of Sciences, Institute of Physiological Active Substances, USSR Academy of Sciences, Chernogolovka, Moscow Oblast'

[Abstract] Results are presented from pharmacologic and biochemical experiments leading to the conclusion that fluorochloronitroacetic acid esters have anticholinesterase activity. Since the esters caused muscular weakness in mice, experiments were performed on isolated tissue preparation. The biochemical experiments consisted of finding the biomolecular constants of irreversible inhibition of acetylcholinesterase by the esters, using acetylcholinesterase from human erythrocytes, as well as horse serum cholinesterase. The ethyl and n-propyl esters of halogen nitroacetic acid were used in all experiments. It was found that the propyl ester caused an increase in the force of individual contractions in the isolated muscle specimens, plus an inability of the muscle to retain tetanus. The substances were determined to have an anticholinesterase effect. The mechanism of cholinesterase inhibition is not yet known. It is most probable that the substances acylate the serine hydroxyl of the esterase center of the cholinesterase. Figure 1; references 7: 5 Russian, 2 Western.
[1625-6508]

UDC 615.919:579.861.2].015.4:616.155.18

MOLECULAR-CELLULAR ASPECTS OF HEMOLYTIC EFFECT OF STAPHYLOCOCCUS α-TOXIN

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian No 9, Sep 84 (manuscript received 25 Oct 83) pp 3-9

IVANOV, N. R. and BRILL', G. Ye., Saratov Medical Institute

[Abstract] The study of changes in permeability of human and sheep erythrocyte membranes upon exposure to staphylococcus α-toxin shows that as

concentration of the toxin increases, the degree of hemolysis and saccharose liberation increases. Sensitivity to the toxin varies widely in erythrocytes of animals of different species. It is thought that the difference results from specifics in the electrostatic interaction of the poison with the negatively charged sections of the cell surface. Data on hemolysis kinetics shows that it is a three-stage process, including absorption of the toxin on the erythrocyte membrane, a change in the structure of the membrane leading to an increase in its permeability and a change in the ion balance and osmotic lysis of the cell with liberation of hemoglobin. It has recently been found that the main membrane glycoprotein liberation from rabbit erythrocytes inhibits its hemolysis induced by the toxin. The nature of the effect of α-toxin after it interacts with a membrane receptor is a subject of lively discussion in the literature. Staphylococcus α-toxin has clear surface activity. Some authors have found no proteolytic activity of the poison. Data on its enzymatic activity are also contradictory. The toxin, a hydrophilic molecule, joins with receptor formations on the surface of the cytoplasmic membrane and, contacting the underlying lipid bilayer, spontaneously associates on the membrane to the form of an oligomer complex, a protein cylinder with a central pore, penetrating the lipid bilayer. The toxin oligomer acts as a channel former, disrupting the barrier properties of the membrane. Figure 1; references: 45 Western.
[124-6508]

UDC 579.842.14:615.919.07

ISOLATION OF SALMONELLA TYPHIMURIUM ENTEROTOXIN IN PARTIALLY PURIFIED FORM AND STUDY OF SOME OF ITS PROPERTIES

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 22 May 84) pp 43-49

FLUER, F. S., Institute of Epidemiology and Microbiology imeni N. F. Gamaleya, USSR Academy of Medical Sciences, Moscow

[Abstract] The purpose of this work was to isolate S. typhimurium enterotoxin in relative form and study some of its physical-chemical, biological and immunologic properties. The method involved centrifugation of the culture fluid, millipore filtration of the supernatant, fractionation of salmonella enterotoxin partially purified by ammonium sulphate in a column filled with sephadex G-150 and merging of fractions of the eluate. Isoelectric focusing was performed by the method of Vestberg and Swensson on an 8100, 110 ml column with 2.0% concentration of ampholins. Disc electrophoresis of the salmonella entertoxin was performed in polyacrylamide gel with tris-glycin buffer. The enterotoxin was active for the rabbit intestine and caused development of both slow and fast skin reactions. The enterotoxin preparation was a protein with isoelectric point 4.4 and immunologic affinity to cholera enterotoxin. Disc electrophoresis in polyacrylamide gel

showed that it contained three components, the biologic activity being neutralized both by homologous serum and by cholera enterotoxin serum. The enterotoxic activity of the preparation decreased upon heating for thirty minutes to 75°C. Figures 4; references 18: 2 Western, 16 Russian.
[124-6508]

UDC 547.964.4.057:577.152.343.042

SYNTHESIS AND BIOLOGICAL ACTIVITY OF NONAPEPTIDE INHIBITOR OF PEPTITIDYL DIPEPTIDASE ANALOGUES

Moscow BIOORGANICHESKAYA KHIMIYA in Russian Vol 11, No 1, Jan 85
(manuscript received 13 June 84) pp 21-30

FILATOVA, M. P., KRIT, N. A., BESCHASTNAYA, N. V., BLOKHINA, A. V., KOZLOVA, N. I., PAVLIKHINA, L. V., YELISEYEVA, Yu. Ye., OREKHOVICH, V. N., REYSSMAN,* Z. and PEGELOV,** I., Institute of Biological and Medicinal Chemistry, USSR Academy of Medical Sciences, Moscow; University* imeni F. Schiller, Jena, GDR, Institute** of Pharmacology and Toxicology, University imeni V. Piek, Rostok, GDR

[Abstract] In the 70's, a series of peptides was isolated from snake venom which potentiated bradykinin action in vitro and in isolated organs; they were specifically inhibiting the activity of carboxycathepsine (peptyl dipeptidase) --the key enzyme in the blood pressure regulating system. The goal of the present study was to evaluate the structure-activity relationship of teprotide; therefore a series of analogues was synthesized replacing various aminoacids in the N-terminal portion of a molecule. The results showed that a positive charge on the aminoacid radical in position 4 is essential for biological activity; it participates evidently in stabilization of the spacial structure by ionic interaction with C-terminal of the carboxylic group. Replacement of (2-tryptophan) had no effect on biological activity. A charge at the N-terminal of the peptide chain lowered the inhibitory action of teprotide analogues against the peptidyl dipeptidase. Figure 1; references 21: 7 Russian, 14 Russian.
[1791-7813]

UDC 577.352.42/45:547.898

EFFECT OF SOME MACROCYCLIC POLYESTERS ON BIOLOGICAL AND ARTIFICIAL MEMBRANES

Moscow BIOLOGICHESKIYE MEMBRANY in Russian Vol 2, No 1, Jan 85
(manuscript received 25 Jul 84) pp 71-76

LUKOYANOV, N. V., VAN'KIN, G. I., ZHURAVLEVA, L. V., PANARIN, V. A. and RAYEVSKIY, O. A., Institute of Physiologically Active Compounds, USSR Academy of Sciences, Chernogolovka

[Abstract] Membrane-active and antiarrhythmic properties were studied of the following macrocyclic polyesters: dibenzomethylphosphonyl-14-crown-5 (I), dibenzomethylthiophophonyl-14-crown-5 (II), dibenzomethylphosphonyl-20-crown-7 (III), dibenzo-18-crown-6 (IV) and several phosphorylated derivatives of cis-diaminodibenzo-18-crown-6 (V). It was shown that I, III and $(C_2H_5O)_2(O)PNH$-derivative of V exhibited antiarrhythmic properties with protective short-term effect in guinea pigs against strophantine-induced arrhythmia regardless of whether they were administered prior to or after injection of strophantine. Ionophoric activity of these compounds towards K^+, Na^+, Ca^{2+} and Mg^{2+} ions was evaluated showing that it could not be responsible for the antiarrhythmic property of these agents. An assumption was expressed that the antiarrhythmic action of the above polyesters was related to their ability to block calcium conductivity of cardiac cells. Figures 3; references 34: 18 Russian, 16 Western (3 by Russian authors).
[1792-7813]

UDC 518.5+519+541.63+577.1

CONFORMATIONAL ANALYSIS OF BIS-QUATERNARY AMMONIUM COMPOUNDS SELECTIVELY BLOCKING CHOLINORECEPTORS

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR, SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 2, Feb 85
(manuscript received 22 Oct 84) pp 64-67

DYADYUSHA, G. G., KORNILOV, M. Yu., ZAMKOVOY, V. I., DEKHTYAR', M. L. and SKOK, V. I., academician, Ukrainian SSR Academy of Sciences, Kiev State University imeni T. G. Shevchenko

[Abstract] A probability analysis was conducted on the interquaternary distances in a series of bis-quaternary ammonium compounds with the general formula $(CH_3)_3\overset{+}{N}-(CH_2)_n-N^+(CH_3)_3 2X^-$, where n = 4-20, known to block nicotinic cholinergic transmission. The interquaternary distances were analyzed in relation to dielectric constants, since such distances are not constant but variable factors depending on free rotation around the C-C and C-N bonds. Data are tabulated for the distances in relation to the dielectric constants, with the

probability of a given distance determined on the basis of rotational-isomeric approximations for each of the n = 4-20 compounds. Consideration of the factors involved in ligand-receptor interaction has shown that optimum blocking should be favored by interquaternary distances prevailing when the dielectric constant is equal to 3.1. Under such conditions there would be optimal correspondence between the disposition of the trimethylammonium groups and the binding sites. References 11: 3 Russian, 8 Western.
[1809-12172]

UDC 616.61-78

PHYSICAL-CHEMICAL CHARACTERISTICS AND BIOMEDICAL EVALUATION OF MICROSPHERICAL CARBON ENTEROSORBENTS

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR, SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 2, Feb 85 (manuscript received 28 Sep 84) pp 79-82

TERNOVOY, K. S., BUTYLIN, Yu. P., academician, Ukrainian SSR Academy of Sciences, STRELKO, V. V., SAKUN, Yu. M., KARTEL', N. T., ROMASHKO, O. A., KUZ'MIN, V. S., ZIMBALEVSKAYA, Ch. M. and DAVYDOV, V. I., Fourth Main Administration, Ukrainian SSR Ministry of Health, Kiev; Institute of General and Inorganic Chemistry, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] The physiological and histological consequences of per os administration of microspherical carbon enterosorbents were studied in rabbits, in an attempt to resolve some of the controversy pertaining to their clinical use in detoxication. The microspheres consisted of 0.3-0.6 mm particles of K^+- or Mg^{++}- treated activated charcoal prepared from synthetic resins. Analysis of blood chemistries demonstrated that as a result of enterosorbent administration serum pH rose to 7.40 from 7.36; a significant increase was also seen in the activities of glutathione peroxidase and glutathione reductase. Other changes included enhanced hepatic oxygen utilization, as well as increased hepatic and intestinal uptake of glucose and pyruvate. Increase in the plasma K^+ concentration was ascribed to desorption of the ion from the sorbent. Histological studies revealed hepatocytic overload with glycogen and fat, marked lymphoid infiltration of the lungs and increased vascular permeability. Tissue activities of alkaline phosphatase and monosmine oxidase were elevated. The general conclusion was that the enterosorbent exerted a positive effect on the body. Figures 2; references 9: 8 Russian, 1 Western.
[1809-12172]

PHYSIOLOGY

UDC 612.822:577.352.3/385

LOCATION OF POINTS OF INTERACTION OF BIS-QUATERNARY AMMONIUM COMPOUNDS WITH CHOLINORECEPTOR

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 10, Oct 84 (manuscript received 24 Jul 84) pp 70-72

DERKACH, V. A., SELYANKO, A. A. and SKOK, V. I., academician, Ukrainian SSR Academy of Sciences, Institute of Physiology, UkSSR Academy of Sciences, Kiev

[Abstract] Based on the potential dependence of the constant of affinity of bis-quaternary ammonium compounds for nicotinic cholinoreceptors, the authors determined the point of interaction of the compounds with the receptors in the electric field of a membrane. A model is presented for interaction of a blocker with a nicotinic cholinoreceptor. Experiments were performed on neurons from the isolated superior cervical ganglion of the rabbit with recording of the membrane potential of the neuron. Calculations showed that for symmetrical bis-ammonia compounds with N = 5 such as pentamethonium, N = 6, N = 7 (heptamethonium) and for one asymmetrical compound, the value of δ averages 40.7±9.1, 31.9±11.7, 60.5±11.4 and 35.4±7.3%, meaning that all of the compounds listed interact with the open ionic channel of the nicotinic cholinoreceptor in the area of 40-60% membrane electric field depth. This corresponds to the area of interaction of the local anesthetic procaine with the nicotinic cholinoreceptor of the end plate and d-TC with the cholinoreceptor of the mollusk neuron. Bis-quaternary ammonium compounds thus interact with the open nicotinic cholinoreceptor channel deeper in the membrane electric field than acetylcholine, opening the ionic channel. References 11: 1 Russian, 10 Western.
[1616-6508]

UDC 612.744.24

EFFECTS OF EXOGENOUS RNA FROM ORGANS OF PHYSICALLY TRAINED ANIMALS

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 278, No 6, Oct 84
(manuscript received 9 Apr 84) pp 1499-1502

SMIRNOV, A. V., Military-Medical Academy imeni S. M. Kirov, Leningrad

[Abstract] Exogenous RNA was used to estimate the significance of processes of protein synthesis in the liver, kidneys, skeletal muscles, brain and spinal cord on the early stage of adaptation of the body to physical loads. Experiments were performed on groups of male white mice. The donor mice were physically trained five times per week for three weeks, the last day to exhaustion. Twenty-four hours after physical testing, gluconeogenesis activity was tested in the renal cortexes of both groups of animals and RNA was extracted from various organs. RNA taken from the organs of the donor mice was injected in the organs of recipient mice twenty-four hours after they were exercised to exhaustion, then one hour later they were exercised to exhaustion again. Only RNA from the liver and kidneys of the trained donor influenced the endurance of the recipients. References 15: 12 Russian, 3 Western. [1611-6508]

UDC 612.178

COOPERATIVE ORGANIZATION OF M-CHOLINORECEPTORS OF FROG MYOCARDIUM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 278, No 6, Oct 84
(manuscript received 13 Jun 84) pp 1503-1506

TURPAYEV, T. M., corresponding member, USSR Academy of Sciences, and
SUSLOVA, I. V., Institute of Biology of Development imeni N. K. Kol'tsov, USSR Academy of Sciences, Moscow

[Abstract] An attempt is made to reach an understanding of the functional significance of different types of response of myocardial cholinoreceptors to acetylcholine. The variability of the Hill factor in various individual R. temporaria, change in n_H in the process of long-term profusion of the ventricles with Ringer's solution and under the influence of acetylcholine were studied. Experiments were performed on isolated frog heart ventricles, contracted under isotonic conditions by individual electrical stimuli at 30 contractions per minute. Experiments were performed at room temperature using ordinary Ringer's solution. The kinetic method of analysis of the dose-effect variation was the main method of investigation. The positive kinetic cooperation observed with acetylcholine acting on the myocardium and the change in n_H from 1 to 2.1 observed may reflect simultaneous functioning of two types of populations of M-cholinoreceptors in the myocardium. The experimentally

observed kinetic cooperation of the cholinergic response of the myocardium to acetylcholine is but an indirect reflection of the reaction between acetylcholine and the cholinoreceptors, since the interaction of the mediator and receptor were studied by recording the final link in the cholinergic process. Kinetic cooperation appears at various levels of the cholinergic mediator process and is apparently a reflection of the specifics of the kinetics of the primary reaction between acetylcholine and the cholinoreceptor.
Figures 3; references 14: 4 Russian, 10 Western.
[1611-6508]

UDC 612.1

INFLUENCE OF OPIOID PEPTIDES AND MORPHINE ON CAPTURE AND LIBERATION OF ^{3}H-DOPAMINE IN RAT BRAIN NEOSTRIATUM

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84 (manuscript received 14 Feb 84) pp 742-745

GODUKHIN, O. V., ZHARIKOV, S. I., TITOV, M. I., BESPALOVA, Zh. D., BUDANTSEV, A. Yu. and IVANITSKIY, G. R., corresponding member, USSR Academy of Sciences, Institute of Biological Physics, USSR Academy of Sciences, Pushchino, Moscow Oblast'

[Abstract] A study is made of the influence of opioid peptides and morphine on spontaneous and evoked liberation of dopamine in the rat brain neostriatum with a cannula with simultaneous recording of electrical activity from the area of superfusion was used to study the liberation of ^{3}H-dopamine under the influence of opioid peptides. The capture of ^{3}H-dopamine by synaptosomes in the presence of opioid peptides and morphine was studied by the use of a P_2-fraction isolated from the caudate nucleus. The data obtained in the experiments indicate that opioid peptides and morphine inhibit the liberation of dopamine evoked by K^+ depolarization. It was found that methenkephalin, its analog and morphine inhibit the capture of ^{3}H-dopamine by the synaptosomes. The results indicate that opioid peptides and morphine influence both capture of dopamine at nerve terminals and its liberation from the endings of the dopaminergic neurons. Figure 1; references 7: 2 Russian, 5 Western.
[1605-6508]

UDC 611.018.74+612.273

FORMATION OF NEW MICROVESSELS IN SKELETAL MUSCLES OF RATS EXPOSED TO HYPOBARIC HYPOXIA FOR ONE WEEK

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 277, No 3, Jul 84
(manuscript received 14 Feb 84) pp 748-751

KONDASHEVSKAYA, M. V., KOSHELEV, V. B. and RODIONOV, I. M., Moscow State University imeni M. V. Lomonosov

[Abstract] A study was made of the question as to whether new microvessels grow in skeletal muscles under the influence of short-term hypoxia. Experiments were performed on mongrel white rats five months in age. One group was exposed to seven days hypoxic adaptation in a pressure chamber, seventeen to eighteen hours per day with chamber altitude 5,000 m. The control group was placed in an identical chamber but at normal atmospheric pressure. The structural component of resistance to profusion of a saline solution was then determined using the posterior portion of the bodies of the rats, and a histochemical reaction to alkaline phosphatase, which is contained in the endothelium of the vessels, was used to analyze changes in the density of microvessels in major muscles. Also, inclusion of ^{3}H-thymidine in the walls of microvessels was studied following its administration 1.5 hours before the animals were sacrificed. Angiogenesis was observed to have occurred, beginning with rapid proliferation of the endothelial walls of the vessels either directly, or by extraction from the tissues of some sort of factor inducing angiogenesis. Hypoxia stimulates division of the vascular endothelial walls. The immediate functional changes in hemodynamics stimulate further structural changes in the vascular tree and angiogenesis. Figure 1; references 15: 6 Russian, 9 Western.

UDC 577.158:616-001.12:599.32

EFFECTS OF IMMOBILIZATION AND HIGH-ALTITUDE ADAPTATION ON ENERGY METABOLISM IN RATS

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 2, Feb 85
(manuscript received 29 Jun 84) pp 76-78

SUTKOVOY, D. A. and BARABOY, V. A., Institute of Physiology, Ukrainian SSR Academy of Sciences

[Abstract] High-altitude adapted (2100 m, 6 months exposure) and unadapted rats were subjected to stress by immobilization (12-14 h) or hyperbaric oxygenation (81.04 kPa for 12-14 h) to assess the effects on lipid peroxidation in hepatic mitochondria and serum. Immobilization significantly enhanced peroxidation, as indicated by mitochondrial and serum levels of malonic

dialdehyde (37 and 78% increases, respectively). Concomitantly, oxidative phosphorylation was depressed to a statistically significant degree. In the altutude-adapted rats, the corresponding changes were far less pronounced. In the unadapted rats hyperbaric oxygenation elicited qualitatively and quantitatively analogous changes. However, adaptation potentiated the increase in lipid peroxidation induced by hyperbaric oxygenation and depression of oxidative phosphorylation. The correlation between activation of lipid peroxidation and inhibition of oxidative phosphorylation was ascribed to the damaging effects of the products of peroxidation on membrane systems. Alleviations of the effects of immobilization in the adapted rats was ascribed to enhancement of antioxidant systems in that group of animals. References: 7 Russian. [1809-12172]

EFFECTS OF BLOOD VOLUME OVERLOAD ON MYOCARDIAL ULTRASTRUCTURE IN RELATION TO ADAPTATION TO HIGH ALTITUDE HYPOXIA

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 6, Nov-Dec 84 pp 36-39

KADYRALIYEV, A. K. and TILIS, A. Yu., Chair of Pathologic Physiology, Kirghiz State Medical Institute

[Abstract] The effects of high-altitude adaptation on the ultrastructural consequences of surgically induced mitral insufficiency (13-18% of total valve area) were studied in dogs maintained at sea level (Frunze, 760 m altitude), and adapted to a 3200 m altitude. At sea level, compensatory myocardial hyperfunction was fully adequate to meet the hemodynamic challenge of the mitral lesion and provide an adequate oxygen supply to the body. No evidence of decompensation manifested itself over a prolonged (10 months) period of observation. In these animals electron microscopy of the myocardium revealed intracellular regeneration of the cardiomyocytes and mitochondrial hypertrophy. Unadapted animals with induced lesions at 3200 m presented with left ventricular decompensation, a reduction in the cardiac index by 26.2%, and circulatory slowdown. Pulmonary hypertension developed, leading to right heart failure and death of 52.9% of the animals from heart failure. Electron microscopy of the myocardial specimens revealed extensive degenerative changes. The sequelae of mitral lesions were less pronounced in the adapted animals, with a mortality rate two-fold lower than for the unadapted dogs. High-altitude adaptation, therefore, was found to alleviate the clinical consequences of surgically induced mitral lesions in dogs under alpine conditions.
[290-12172]

UDC 612.273.1+612.766.1+616

CARDIORESPIRATORY FUNCTION AND WORK PERFORMANCE DURING ADAPTATION TO INDUSTRIAL LABOR IN MIDALPINE CONDITIONS

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 1, Jan-Feb 85 pp 10-12

MAMBETALIYEV, B. S. and AKYNBEKOV, K. U., Chair of General Hygiene, Kirghiz State Medical Institute

[Abstract] Various aspects of the cardiorespiratory system were analyzed in miners working under moderate altitude conditions in Kirghizia, using workers with more than 3 years of employment (adapted group) in the industry and newcomers (unadapted) to the region. Under the conditions investigated (1800-2000 m altitude, dry, continental climate with temperature range of +16.2 to +29.2°C and relative humidity of 42-68%), the demanding physical labor was performed with no loss of work efficiency in comparison with similar work performed at low altitudes in the case of the adapted individuals. The cardiorespiratory system functioned more efficiently in the adapted individuals with an arteriovenous oxygen difference equivalent to 93.3 ± 3 cm^3/liter at rest, yielding an oxygen utilization coefficient of 43%. The minute volume in the adapted workers, tested with a physical load of 480 kilogrammeters/min, was 1.2 liters/min, which was higher than under low altitude conditions but significantly lower than in the unadapted group exposed to a similar load. Despite the fact that adapted individuals present with a more efficiently functioning cardiorespiratory system at rest, and especially during physical exertion, working under moderate high-altitude conditions does place an additional demand on the system, which should be a factor of consideration in the health assessment of that group of workers.
[276-12172]

UDC 612.44+577.17+612.273

STRUCTURAL CHANGES IN THYROID DUE TO HIGH-ALTITUDE ADAPTATION IN KIRGHIZIA

Frunze ZDRAVOOKHRANENIYE KIRGIZII in Russian No 1, Jan-Feb 85 pp 32-35

LYAMTSEV, V. T., RAZUMOVSKIY, Yu. K., TURGUNBAYEV, M. D. and BRAGIN, M. O., Chair of Pathologic Anatomy, Kirghiz State Medical Institute

[Abstract] A variety of thyroid enzymes involved in redox reactions and in catalytic hydrolysis were monitored in outbred rats in Tuya-Ashu (elevation 3200 m) for a period of 60 days, to determine the effects of hypoxia on thyroid cytochemistry. Initially, the PAS reaction became weaker, while cytochemical analysis showed elevation of succinic dehydrogenase, cytochrome oxidase, lactate dehydrogenase, and acid phosphatase activities. ATPase

activity remained unaltered and alkaline phosphatase activity showed a time-dependent depression. The data were interpreted to indicate depressed thyroid function under hypoxic conditions for ca. the first 20 days. After 20 days, the cytochemical studies on enzymatic activities and the PAS reaction indicated functional recovery, which was essentially completed by day 60. Figure 1.
[276-12172]

PUBLIC HEALTH

NEW FORMS OF PHARMACY SERVICES DISCUSSED

Leningrad LENINGRADSKAYA PRAVDA in Russian 6 Mar 85 p 4

[Interview with T. V. Zaychenko by T. Kasatkina]

[Text] Letters are received by the editorial office, in which readers express interest in new forms of pharmacy services to patients. At the request of our correspondent, T. Kasatkina, this question is answered by T. V. Zaychenko, deputy chief of the Pharmaceutical Administration.

Today, more than 2000 drugs are used in our country. Each year, 50-60 new agents are delivered to the pharmaceutical network, their production in our country and exported drugs are increasing from year to year. Still, there is a shortage of some types of products. Some cardiovascular agents, antibiotics, enzymes and cholagogues are still being supplied in limited quantities.

For this reason, greater demands are made of the pharmacy service--every patient who comes must definitely be provided with his medication. In the case of temporary unavailability of an agent prescribed by the physician, the prescription can be left for guaranteed filling. Pharmacy employees enter it in a log and make every effort to see that the patient can obtain this drug--they phone other pharmacies and inquire at the pharmacy warehouse. If, however, the drug is unavailable in the city, they must get in touch with the physician and see if it can be replaced with another one, with analogous action. Herein lies the essence of the guaranteed method of serving patients.

One can go to any district of the city to get medication, but for greater efficiency it is desirable to do so in the pharmacy that is closest to the polyclinic where the patient is being treated, since this makes it simpler to contact the physician who wrote the prescription.

New means of introducing progressive forms of servicing the public are being sought constantly. Specialization is one of these new directions. Pharmacies dealing in ready-made drugs, a children's pharmacy, pharmacies servicing medical and preventive institutions are already operating with success....

Another form appeared in recent years, the office method. Visitors enter the office one at a time, like they do when they see their physician, and the pharmacist has the opportunity to explain in detail to the patient the rules for taking the prescribed medicine, call attention to its proper storage in the home and answer any questions. To reduce the time for dispensing prescriptions, another new method was introduced, without a receipt--the patient is given a token instead of a receipt, and the number on it corresponds to the prescription.

Such progressive methods as delivery of drugs to the home of seriously ill patients who live alone, taking phone orders from physicians, informing patients when a lacking product has arrived and visits to major industrial enterprises have already gained a firm foothold in the work of the pharmacy service. Special attention is given to the disabled and veterans of the Great Patriotic War.

Pharmacy workers always bear in mind that a person comes to them with his pain, his problems and hopes of receiving emergency help. Their main task is to help him.

10,657
CSO: 1840/283

SPECIAL TREATMENT OF MEDICAL WORKERS

Tallin SOVETSKAYA ESTONIYA in Russian 10 Feb 85 p 2

[Text] Some polyclinics in Tallin take care of medical workers out of turn. Does this practice apply to all medical workers? [signed] M. Popova, Tallin.

Dear Comrade Popova:

We asked LEG NIKOLAYEVICH YURKEVICH, deputy chief of the Administration for Medical and Preventive Care, Estonian Ministry of Health, to answer your question, which is relevant to many medical people.

I believe that this question should be examined in conjunction with the overall set of steps provided under the current five-year plan for improvement of the quality of rendering medical and preventive care to public health workers. The steps pertain to a wide range of problems, including improvement of working conditions and labor safety of medical workers, lowering industrial fatigue, preventing exposure to adverse factors when using modern equipment, expanding sanatorium and resort therapy and others.

There are also rules for medical care of public health workers. For example, the recent order issued on 7 January 1985 of our ministry, which was approved on the basis of the order of the USSR Ministry of Health, requires that qualified medical and preventive care of medical workers be organized everywhere, and for those employed at major health care institutions this should be done right where they work and for those employed in smaller or specialized institutions, in medical-preventive centers situated in their vicinity. Special physicians are also assigned to take care of medical workers--internist, obstetrician-gynecologist and stomatologist. In this case, the question of order of being seen is resolved on its own. As for services in other medical institutions, practice has shown that this matter is resolved locally in accordance with capacities and is not controlled by a general rule.

10,657
CSO: 1840/283

MEETING OF POLITBURO OF CPSU CENTRAL COMMITTEE

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 5 Apr 85 p 1

[Text] The Politburo of the CPSU Central Committee approved at its regularly scheduled meeting the Appeals of the CPSU Central Committee for the International Holiday of Workers on May 1.

At the meeting there was discussion of a number of questions related to deployment of preparations for the 27th CPSU Congress, improving effectiveness of our economy, introducing scientific and technological advances into industry, strengthening discipline and excluding phenomena alien to socialism from the life of the community.

Considering the numerous suggestions of workers received in central and local agencies, the Politburo discussed comprehensively the question of controlling drunkenness and alcoholism.

Viewing the overcoming of this ugly phenomenon as a social objective of major political importance, the CPSU Central Committee approved of a set of major sociopolitical, economic, administrative, medical and other steps to reinforce the fight against heavy drinking and alcoholism, and their elimination from the life of our society. It was emphasized in particular that there must be systematic implementation of measures to control drinking, a unification and constant coordination for this purpose of state and economic agencies, party and public organizations, and broad deployment of propaganda against drinking.

Suggestions were approved for improving legislation aimed at the control of drinking and a system of measures that will be implemented for this purpose by the USSR Council of Ministers, ministries, agencies and law-enforcement agencies.

The Politburo heard the report of Comrade G. V. Romanov concerning the participation of the CPSU delegation in the work of the 13th Congress of the Hungarian Socialist Workers' Party. The activities of the delegation and outcome of its talks with Hungarian administrators were approved. The conviction was expressed that the decisions of this congress aimed at further consolidation of the positions of socialism in Hungary will be instrumental in developing a fraternal friendship and comprehensive collaboration between the CPSU and the Hungarian Socialist Workers' Party, Soviet Union and the Hungarian People's Republic, strengthening the solidarity of socialist nations in their common struggle for peace and safety of peoples.

There was discussion of the outcome of the talks of comrades V. I. Vorotnikov and V. V. Shcherbitskiy with L. Shpet, president of the FRG Federal Council and premier-minister of Baden-Wurtemberg, who was in the Soviet Union at the invitation of the USSR Supreme Soviet. It was noted that there are considerable opportunities in our countries for development of mutually beneficial relations on the basis of the Moscow agreement between the USSR and FRG, with due consideration of the interests of both sides.

Several other questions of implementation of the party's economic and social policies, strengthening collaboration with fraternal socialist countries, safeguarding universal peace and safety of people on our planet were discussed at the meeting of the Politburo of the CPSU Central Committee.

10,657
CSO: 1840/285

UDC 613.6-055.2:636

URGENT PROBLEMS OF WORK HYGIENE AMONG WOMEN IN MODERN ANIMAL HUSBANDRY

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 9, Sep 84 (manuscript received 10 May 84) pp 14-17

NIKOLOV, S. Kh., NEFEDOV, P. V. and KLIMENKO, A. A., Kuban' Medical Institute imeni The Red Army, Krasnodar

[Abstract] Studies over a number of years have shown that the health status of women involved in animal husbandry in Kuban' is worse than that of men. Examinations show that women workers in this field have diseases of the internal organs 18.4% more frequently, particularly diseases of the cardiovascular system and gastrointestinal tract. Nervous system diseases are primarily functional, are 42% more frequent, as are diseases of the genitourinary tract, most frequently chronic diseases of the genitalia. Working conditions are particularly undesirable in poultry and swine farms, where exposure to ammonia in combination with high temperatures and humidity is a problem. Broad scale sociologic-hygienic research is needed to determine further improvements which can be made in the health situation of women in animal husbandry in the Kuban' region. References: 6 Russian.
[105-6508]

UDC 613.633:636.085/.87

NATURE OF ACTION ON THE BODY OF ANIMAL FEED DUST OF VARIOUS COMPOSITIONS

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 9, Sep 84 (manuscript received 9 Jan 84) pp 42-43

MOSENDZ, S. A., Institute of Labor Hygiene and Occupational Diseases, Kiev

[Abstract] Dust is the major harmful environmental factor in animal feed processing plants. Feeds include grain components, substances containing protein, mineral substances, grass flower and premix components containing vitamins, trace elements, etc. White mice received feed powders intratracheally in saline solution, a control group receiving saline solution alone. The studies show that after intratracheal administration of KR-1 and KR feed dust into the lungs, intensive formation of collagen proteins occurred. The changes were statistically significant after one month of exposure, increasing with increasing observation time. A statistically significant increase in the glycogen content of the liver of the experimental animals was also observed. KR-4 feed powder caused a decrease in the content of RNA and DNA in the liver. The studies indicate a complex mechanism of action of mixed fodder powder on the body. References 6: 3 Russian, 3 Western.
[105-6508]

UDC 616-057:378,661

MEASURES FOR FURTHER IMPROVEMENT OF TRAINING OF PHYSICIANS AND SCIENTIFIC WORKERS ON OCCUPATIONAL PATHOLOGY IN CONNECTION WITH ARTICLE BY N. P. STERKHOVA 'COMBINED INSTRUCTION ON OCCUPATIONAL DISEASES IN THERAPEUTIC DEPARTMENT OF SVERDLOVSK MEDICAL INSTITUTE'

Moscow GIGIYENA TRUDA I PROFESSIONAL'NYYE ZABOLEVANIYA in Russian No 9, Sep 84 pp 53-55

ZISLIN, D. M.

[Abstract] This article, written in response to an article which appeared in the same magazine, Number 11, 1982, page 34, describes the teaching of the subject mentioned in the title at Sverdlovsk Medical Institute. At this institute, not only the Department of Occupational Diseases, but also all other departments in the therapeutic faculty discuss problems of occupational disease in relationship to the specifics of each particular discipline. The author of the present article reports that the critical comments in the cited article are not the major reason for writing the present article. Occupational disease meets all conditions defining it as an independent clinical discipline. However, the information required by this science is so broad that it cannot be restricted to the framework of a single existing clinical discipline. The occupational disease physician does not fit any existing medical specialty. Only by differentiating occupational pathology with respect to the major clinical disciplines, the specialty of the occupational pathologist with respect to the major medical specialties, can the unlimited and universal nature of occupational pathology be overcome. Further reductions in occupational morbidity require that occupational pathology be acknowledged as a separate and special discipline.
[105-6508]

MEDICINAL PLANTS

Moscow LITERATURNAYA GAZETA in Russian 21 Nov 84, p 21

SILINA, Galina

[Abstract] The author presents several anecdotes concerning successful herbalists, folk medicine practitioners who treat 'patients' with traditional herbal medicine and without benefit of medical education. The generally favorable reports include the story of Valeriy Pavlovich Malyshev, an operatic bass who was struck down by a severe disease, received no benefit from ordinary medical treatment, studied herbal medicine and treated himself as well as large numbers of other patients with great success. A lawyer, a physician and two citizens present commentaries on the usefulness and danger of herbalists.
[134-6508]

UTILIZATION OF MEDICAL EQUIPMENT

Moscow SOVETSKAYA ROSSIYA in Russian, 21 Nov 84, pp 1-2

BEZBORODOV, V., Medical Equipment Engineer, State Prize Laureate, Odentsovo, Moscow Oblast

[Abstract] A visit to medical facilities in Lipetsk evokes complaints of unreliability of medical equipment such as fiber optic gastroscopes, delivery of equipment not ordered and failure to deliver equipment desired. Personal responsibility for operation and maintenance of medical equipment is suggested as a means to improve operational quality of equipment.
[131-6508]

UDC 614.7-07:616-008.9-074

METHODOLOGIC APPROACHES TO PREDICTION OF FUNCTIONAL STATUS OF BODY EXPOSED TO UNFAVORABLE ENVIRONMENTAL FACTORS

Moscow GIGIYENA I SANITARIYA in Russian No 10, Oct 84 (manuscript received 21 May 84) pp 7-11

SHPILEVSKIY, E. M., LUGOVSKIY, V. K. and YSHKOVA, L. A., Minsk Medical Institute

[Abstract] The viability of the body under various environmental stresses can be evaluated at three levels: physiological status without stress, stress on the compensatory-adaptive mechanisms and pathologic (disadaptation) state with decompensation of adaptive mechanisms. After evaluation of the information content of biochemical indicators, several priority tests were selected to detect the transition from adaptive norm to pathology: content of M-acetylmuraminic acid, activity of Na^+K^+-ATPase, intensity of peroxide oxidation of lipids, level of malonic dialdehyde, activity of gamma-glutamyltransferase, activity of β-galactosidase, activity of acetylesterase, activity of malate dehydrogenase, level of reduced glutathione, activity of glutathione peroxidase and content of albumins. The use of biochemical tests characterizing the damaging effect of toxicants allows a quantitative evaluation of toxicity of various substances and prediction of the degree of damage to functional systems. Figures 2; references: 6 Russian.
[079-6508]

UDC 613.632+614.7:66]-07:[616.1-008.1+616-092:612.017.1

INFORMATION CONTENT OF FUNCTIONAL STATUS INDICATORS OF BODY EXPOSED TO VARIOUS LEVELS OF CHEMICAL POLLUTION

Moscow GIGIYENA I SANITARIYA in Russian No 10, Oct 84 (manuscript received 16 Apr 84) pp 11-14

PROKOPENKO, Yu. I., KLIMOVA, D. M., IL'IN, V. P., TORIYA, L. K. and MAZURINA, T. L., Scientific Research Institute of General and Communal Hygiene imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow

[Abstract] Electrophysiological and other methods characterizing the status of the cardiovascular system, sensomotor reactions and immunologic reactivity were used to examine 94 workers, 18 to 55 years of age, exposed to various levels of chemical pollution. Mathematical processing yielded data confirming the variation in the functional status of the body as a function of the intensity of the chemical load. The bodily systems vary in their sensitivity to chemical pollution. The most sensitive are the vascular and central nervous systems and specific allergenic effects. The data presented indicate the possibility of ranking indicators of the functional status of the body as a function of the degree of chemical exposure. The specific composition of the chemical pollutants in the city in which the study was performed may have affected the results. Figures 3; references: 11 Russian.
[079-6508]

UDC 617-616-089.5+616-036.882-08-039.72]-053.2:001.8

ACHIEVEMENTS, PROBLEMS AND SCIENTIFIC PROSPECTS IN PEDIATRIC SURGERY, ANESTHESIOLOGY AND INTENSIVE THERAPY

Moscow VESTNIK AKADEMII MEDITSINSKIKH NAUK SSSR in Russian No 9, Sep 84 (manuscript received 8 Dec 83) pp 3-6

ISAKOV, Yu. F., Moscow

[Abstract] The rapid development of pediatric surgery is closely related to the rapid development of science in general. The advent of fiber optic techniques has led to the creation of precision endoscopic instruments allowing inspection of previously inaccessible areas of the gastrointestinal and respiratory tracts. Laser, ultrasound, low-temperature and magnetic devices are used increasingly in pediatric surgery. Pediatric pulmonology has seen the creation of various methods for temporary or permanent occlusion of the bronchi for treatment of bronchopleural fistulas and to seal the lungs after pneumoabscessotomy in cases of acute bacterial damage to the lungs. Modern methods of monitoring the status of immunity and adjusting it are great achievements in the area of infection control in surgical patients.

Hemosorption and exchange transfusions of the blood allow physical treatment of bacteremia in sepsis patients. Microsurgical techniques have advanced greatly as well. Future problems include revision of surgical tactics in the treatment of bacterial pulmonary destruction. Endovascular methods of treatment of vascular diseases require further study. Greater attention must be given to the development of domestic preparations for selective enteral and parenteral nutrition.
[074-6508]

RURAL MEDICAL CARE

Yerevan KOMMUNIST in Russian 30 Oct 84, p 2

MIDOYAN, A., chairman, Commission on Public Health, Social Security and Physical Culture, Supreme Soviet, Armenian SSR

[Abstract] The work of therapeutic and prophylactic institutions, organization of labor of medical workers and quality of medical services in rural areas in Armenia have all improved markedly in recent years. Medical services provided by the central rayon hospital, polyclinic and ambulatory medical points in one rayon are described in this article. Problems still unresolved are a result of insufficient control by the executive committees of regional and agricultural Soviets and the ambivalent attitude of many agricultrual administrators toward the needs of medical institutions. Problems include insufficiency of medical equipment, poor quality construction of medical institutions, with one obstetric point located in a private home, and insufficient number of beds per unit of population. The regional executive committee and Ministry of Agriculture of the republic are called upon to allocate the necessary funds for construction of additional medical facilities as required. An additional problem is that the central rayon hospital now has the responsibility for all organizational and professional problems relating to health services in the rural area, the previous public health departments responsible for many such problems having been disbanded. The author calls for creation of such departments anew. The improvement of public health services in rural areas will require the dedicated work of all employees of the medical service system.
[113-6508]

PETROZAVODSK STUDENT POLYCLINIC

Moscow SOVETSKAYA ROSSIYA in Russian 30 Mar 85 p 1

KURBATSKAYA, O., PANKOV, V., RUKAVISHNIKOVA, L., and SAVINONOVA, O.,
Petrozavodsk-Gorkiy-Tomsk

[Abstract] This article entitled "For Your Examination, Doctor" discusses the present state of provision of medical aid to Petrozavodsk State University students and emphasizes the need for a specialized student polyclinic to improve the quality of medical care. Organization of such a polyclinic in Gorkiy is discussed and problems encountered there are pointed out. The system of provision of medical care for students of a university, 5 institutes and 17 technical high schools and schools in Tomsk is described and is recommended as a fine example worthy of imitation. G. V. Sergeyev, first deputy minister of health, comments on this situation and points out several other major areas of concern in the attempt to provide student health care in this region.
[286-2791]

CARE FOR RURAL WORKERS (From All-RSFSR Council of Kolkhozes)

Moscow SEL'SKOYE KHOZYAYSTVO ROSSII in Russian No 2, Feb 85, p53

[Abstract] The All-Russian Council of Kolkhozes reconfirmed the idea that production successes are impossible without concern for people and creation of good conditions for work, life and recreation as it approved the work carried out in Penz Oblast on social reconstruction of village areas. This reconstruction includes construction of dwellings, schools, kindergartens and creches, 12 new ambulatoriya, improvement of the material and technical bases of interkolkhoz construction organizations and improvement of cultural services. These achievements are counterbalanced by the high cost of homes, poor construction and delay in putting items into operation. The Council also examined the work of the Roskolkhozzdrav association on development and improvement of use of the network of sanatorium-health resorts and pioneer camps. In the first 4 years of the 11th Five-Year Plan, 87.4 million rubles were appropriated from a centralized union fund of social insurance for construction of health resorts while 23 million rubles were appropriated in 1984. The long-range plan extending up to 1990 for Roskolkhozzdrav provides for a 1.6-fold increase of volume of capital investments over the 1984 level for building sanatoria, a 1.7-fold increase for building sanatoria-health centers and almost a 3-fold increase for building pioneer camps. The impact of this program is discussed. It still does not meet the needs of the workers for health care and rest.
[289-2791]

TARGET PROGRAMS IN FIVE-YEAR PLANS OF ASSOCIATIONS

Moscow PLANOVOYE KHOZYASTVO in Russian No 3, Mar 85, pp 112-113

TIZYAKOV, A., general director, Sverdlovsk Industrial Association "Mashinostroitel'nyy Zavod imeni M. I. Kalinina," SEMYASHKIN, F., candidate of economic sciences, and KRUGLOV, A.

[Abstract] Target programs constitute an integral part of economic planning, and are gaining extensive application in industrial associations. Various elements of such programs have been previously utilized at the Sverdlovsk Industrial Association "Mashinostroitel'nyy Zavod imeni M. I. Kalinina," but the most detailed plans were impelemnted in the Five-Year Plan covering 1981-1985. The plan for the Association consisted of several independent and interdependent programs. One program called for decreasing manual work by 3.9%, while another targeted a 5.3% reduction in workday losses due to illness (primarily respiratory infections, condiovascular diseases, gastrointestinal problems, trauma, and so forth). It has been estimated that meeting the latter goal would facilitate a reduction in the workforce by 200 workers and improve productivity figures. Implementation and successful conclusion of such programs require the participation of various specialists in technical fields, economics, and administration. These specialists were organized into special commissions headed by top members of the management team.
[288-12172]

FIRE PREVENTION AND CONTROL IN MOSCOW REGION

Moscow LENINSKOYE ZNAMYA in Russian 17 Feb 85 p 3

IVANOV, O.

[Abstract] The increase in recent years of fires in the Moscow oblast has caused considerable concern among the citizenry, especially the fact that last year 300 lives were lost in various fires, 19 of them children. This was the highest incidence of human losses in the last 25 years. An interview with militia colonel O. G. Stankovich, who is the director of the Moscow Oblast Fire Department, has provided insight into some of the problems that the firefighters encounter. Stankovich pointed out that in the last ten to fifteen years the nature of fires has changed, and that presently about 70% of the victims succumb to inhalation of toxic fumes rather than from burns suffered in a fire. Plastics, which are now used extensively at home and at work, can produce extremely toxic gases even when the flame is small and contained. In addition, extensive building construction in the Moscow Oblast has been accompanied by the use of gas for cooking and heating, adding yet another risk factor to that represented by various electrical appliances. One of the most effective means of fire prevention is proper eduction of the populace in safety measures. In addition, both the educational and preventive measures are especially effective when started with young children.
[292-12172]

UDC 613/.614+362.1](571.1/.5)

HUMAN HEALTH IN SIBERIA

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 12, Dec 84 (manuscript received 5 Oct 84) pp 3-7

[Abstract] The "Human Health in Siberia" program, administered by the Siberian Department of the USSR Academy of Medical Sciences, constitutes an independent entity within the "Siberia" program. It serves to integrate the social, hygienic, biomedical and medical aspects of the human population in Siberia, the Far East, and the Far North. Research conducted under the auspices of that program has as its primary goal the prevention and reduction of morbidity and mortality, the promotion of physical development, stabilization of reproductive processes, and management of biological and psychosocial adaptation in these developing industrial regions. Among the most important factors, leading to loss of productive capacity of the population as a result of mortality, are cardiovascular diseases, accidents, poisoning, and trauma, as well as malignancies and respiratory diseases. These four factors are responsible for 70-90% of the mortality. These facts alone indicate the importance of preventive medicine, medical education of the population, and of measures taken to improve the living conditions in the further development of these regions.
[277-12172]

UDC 616.12-008.331.1+616.12-005.4]-036.2

COMPARATIVE ANALYSIS OF CARDIOVASCULAR MORBIDITY AND MORTALITY IN TOMSK OBLAST

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 12, Dec 84 (manuscript received 17 Apr 84) pp 11-14

PLOTNIKOVA, N. D., ZYRYANOVA, T. M. and OLEYNICHENKO, V. F., Siberian Branch, All-Union Cardiological Research Center, USSR Academy of Medical Sciences; Chair of Social Hygiene and Public Health Administration, Tomsk Medical Institute

[Abstract] A comparative analysis was conducted on cardiovascular morbidity in the rural and urban population of the Tomsk Oblast, on the basis of patient visits to hospitals and clinics over the 1978-1982 period. During the period in question, the incidence of hypertension and ischemic heart disease in the Oblast increased by 27.1 and 8.8%, respectively. Analysis of the mortality figures revealed that ischemic heart disease and cerebrovascular disease were the leading causes of death. Furthermore, 41.6% of such deaths were due to cerebrovascular disease at the Oblast central clinic, whereas, in other rayons of the Oblast, ischemic heart disease was the leading cause of death (37.5%) in the cardiovascular disease group. These facts, as well as the regional differences in the incidence figures for the different types of cardiovascular pathology, indicate the need for diagnostic centers in the more distant areas of the Oblast.
[277-12172]

HEALTH INDUSTRY: SUCCESSES AND PROBLEMS

Tashkent EKONOMIKA I ZHIZN' in Russian No 2, Feb 84, pp 65-67

TULYAGANOV, K. S., chief of Tashkent Municipal Executive Committee of Main Board of Health

[Abstract] A general description of the organization of the Tashkent medical service emphasizes the fact that the vastness of the organization and operation of this service justifies the use of the term "health industry" when referring to it. Tulyaganov points out inadequacies in services in spite of increases in the number of personnel and new equipment available and lagging construction of medical facilities in spite of availability of state funds. He recommends greater use of polyclinics and more specialization. He reports that a special sanatorium in Tashkent for myocardial infarction patients is returning 85 percent of its patients to work. He discusses deficiencies in first aid and emergency squad organization and operation. He cites needs for improvement in retraining and advanced training of physicians.
[299-2791]

RADIATION BIOLOGY

CALIFORNIUM IN SERVICE OF MANKIND

Moscow MEDITSINSKAYA GAZETA in Russian 2 Nov 84, p 3

TSYB, A., professor, chairman of Coordination Council of the 'Kalifornium-252' Program, director, Institute of Medical Radiology, USSR Academy of Medical Sciences; VTYURIN, B., doctor of medical sciences and IVANOV, V., candidate of technical sciences, Obninsk

[Abstract] The clinical study of radioactive Californium-252 is one of three national interdepartmental programs to be undertaken during the 11th Five-Year Plan according to a plan approved by the Scientific Council for Radiology, USSR Academy of Medical Sciences. The use of neutron sources made of Californium-252 for the treatment of cancer patients is recognized in this program as an important trend in the combined utilization of radioactive isotopes. The Californium-252 program is essentially the first attempt at organization of technical studies and development with simultaneous utilization in clinical practice. Fellows at one scientific research institute have created neutron sources of various types using the element. A second technical institute is studying the design of neutron contact therapy apparatus. Seven medical institutes have worked jointly to develop the method of neutron therapy itself. Over six hundred patients have been treated by Californium neutron therapy. Intratissue implant Californium therapy has been used to avoid severe surgery in oral cancer.
[1623-6508]

UDC 616.9-085.373.6:547.962.4].033.1

STUDY OF INFLUENCE OF HOMOLOGOUS SERUM GLOBULIN PREPARATIONS ON MOUSE INTESTINAL AUTOMICROFLORA AFTER IRRADIATION

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 20 Oct 83) pp 61-65

PINEGIN, B. V., KLEMPARKSAYA, N. N., MALTSEV, V. M., KORSHUNOV, V. M., SHALNOVA, G. A. and KUZMINA, T. D., Second Moscow Medical Institute; Institute of Biophysics, USSR Ministry of Health

[Abstract] A study was performed to reveal the presence and nature of influence of homologous globulin serum preparation on the autoflora of the large and small intestine of irradiated mice, to study the variation in the effect of globulin as a function of content of normal antitissue antibodies in the globulin and to determine changes in intestinal flora after application of globulin, IgM and IgG fractions. Administration of globulin, IgG and IgM fractions from hemostimulated donor mice 2, 24 and 48 hours after irradiation at a dose of 1 mg per mouse caused suppression of development of dysbacteriosis of the intestinal microbes. The size of the opportunistic bacteria population in small and large intestines decreases more than that of lactobacteria. Globulin and IgG from hemostimulated mice with a higher content of normal tissue antibodies are most effective. References: 7 Russian. [124-6508]

UDC 615.919:579.843.1].015.4:615.849.1

INFLUENCE OF GAMMA RADIATION ON IMMUNOBIOLOGIC AND IMMUNOCHEMICAL PROPERTIES OF CHOLERA EXOTOXIN. IV. BIOLOGICAL AND IMMUNOCHEMICAL PROPERTIES OF PURIFIED IRRADIATED CHOLEROGEN

Moscow ZHURNAL MIKROBIOLOGII EPIDEMIOLOGI II I IMMUNOBIOLOGII in Russian
No 9, Sep 84 (manuscript received 14 Sep 83) pp 90-93

NEDUGOVA, G. I., RUBTSOV, I. V. and SAMOYLENKO, I. I., Central Scientific Research Institute of Epidemiology, USSR Ministry of Health, Moscow

[Abstract] A study is made of the effect of various doses of gamma radiation on the properties of purified cholerogen. The method of isoelectrofocusing was used to produce purified cholerogen from a culture toxin filtrate of the cholera vibrion strain 569B, Inaba serotype. The cholerogen contained no O antigen for ballast substances from the culture medium. It was irradiated under the same conditions as unpurified cholera exotoxin. The nature of changes in immunobiologic and immunochemical properties of the purified cholerogen under the influence of gamma radiation was studied. The inactivating effect of gamma radiation on purified cholera exotoxin was achieved at a

dose of 25 kGr. The threshold dose of gamma radiation for decreasing the permeability factor was 50 kGr. As the radiation dose increased there was an increase in electrophoretic mobility of individual protein fractions, aggregation of fast moving components and a decrease in the total number of protein zones in purified cholerogen preparations. The immunogenic and antigenic properties of the irradiated purified cholerogen were retained within the limits of the radiation doses used. The data utilized served as a basis for developing a method of producing cholera anatoxin which has been patented. Figure 1; references 10: 5 Russian, 5 Western.
[124-6508]

UDC 547.963.3:591.044.82

EFFECTS OF PHYSICAL, CHEMICAL OR BIOLOGICAL FACTORS ON DNA REPLICATION IN MAMMALIAN CELLS. PART 2. RECOVERY OF DNA COMPLEX, NUCLEOID AND DNA REPLICATION AFTER GAMMA IRRADIATION

Leningrad TSITOLOGIYA in Russian Vol 26, No 11, Nov 84 (manuscript received 19 May 83) pp 1323-1326

SYNZYNYS, B. I., KISELEVA, V. I. and TROFIMOVA, S. F., Scientific Research Institute of Medical Radiology, USSR Academy of Medical Sciences, Obninsk

[Abstract] Murine LL cell line was employed in studies on the effects of gamma irradiation (6 Gy, 8 Gy/min from Co-60 source) on the kinetics and repair of DNA superstructure and recovery of DNA synthesis. Comparison of the kinetic data for the postradiation repair of the DNA-membrane complex, nucleoid, and recovery of DNA synthesis demonstrated that functional recovery of the former two factors preceded DNA synthesis by at least 2 h. In view of this lag, it appears that additional factors are involved in radiation damage that must be repaired before DNA synthesis commences. Figures 3; references 10: 5 Russian, 5 Western.
[291-12172]

UDC 575.24:616.36.002

MUTAGENIC INFLUENCE OF HB_sA_q ON CHROMOSOMAL APPARATUS OF SOMATIC CELLS IN EXPERIMENTS

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 10, Oct 84 (manuscript received 26 Mar 84) pp 64-67

BARILYAK, I. R., MITCHENKO, I. K. and TOPOL'NITSKIY, V. S., Kiev Institute of Continuing Education of Physicians, USSR Ministry of Health

[Abstract] Results are presented of studies of the chromosomal apparatus of somatic cells of mature animals and fetuses in postimplantation stages of development upon exposure to donor blood serum containing HB_sA_q. Experiments were performed on Wistar rats by administration of 1.0 ml of donor blood serum intraperitoneally from hepatitis B carriers with HB_sA_q titer 1:8. The animals were sacrificed after two, four and seven days, marrow extracted from the femurs and used to prepare chromosomal preparations by the method of Ford. Indicators of the influence of HB_sA_q on the chromosomal apparatus of these somatic cells included changes in the number and structure of chromosomes. Gaps were not analyzed as chromosomal aberrations. The blood serum of donors that were hepatitis B virus carriers was found to have a clear mutagenic effect on the bone marrow cells of recipients, appearing maximally two to four days after administration of the serum, although chromosomal apparatus disorders were not fully moderated even at the seventh day. The agent had a greater effect on chromosomal apparatus of rat fetuses than the somatic cells of mature animals. However, the chromosomal aberrations in the fetuses were completely moderated after four days. References 15: 8 Russian, 7 Western. [1616-6508]

UDC 614.1:614.2](571.1/.5):061.3"1984"

SCIENTIFIC AND PRACTICAL CONFERENCE ON 'DEMOGRAPHIC PROCESSES IN SIBERIA AND EFFECTIVE PUBLIC HEALTH PRACTICES'

Moscow ZDRAVOOKHRANENIYE ROSSIYSKOY FEDERATSII in Russian No 12, Dec 84 pp 38-41

GRIGOR'YEV, Yu. A., DMITRIYEV, V. I. and NIKOL'SKIY, A. V., candidates of medical sciences, Novokuznetsk, Moscow

[Abstract] At the end of 1984 a conference entitled "Demographic Processes in Siberia and Effective Public Health Practices" was held in Novokuznetsk at the Institute of Complex Problems in Hygiene and Occupational Diseases of the Siberian Department of the USSR Academy of Medical Sciences. The conference was attended by more than 100 party works, government officials, representatives of community organizations, physicians, economists, biologists, mathematicians, and others. The conference dealt with various medical and social aspects of demographic processes and the administration of public health services in Siberia, the Far East, and the Far North, which were covered in 35 reports. The participants delineated the type of health care services that are most suitable to the conditions prevalent in the regions in question, and the methods by which social and cultural needs of the population can be met. In conclusion, a decision was made to publish regularly the proceedings of such conferences, and to hold regular seminars and conferences addressing the demographic and medical problems of Siberia, the Far East and the Far North.
[277-12172]

MISCELLANEOUS

PROGRAMS NOT AVAILABLE FOR MEDICAL RESEARCH EXPLOITATION OF NEW MICROCOMPUTERS

Moscow MEDITSINSKAYA GAZETA in Russian 27 Mar 85 p 2

[Letter by S. Vaynshteyn, professor (Ternopol')]

[Text] Programmable microcalculators have made possible rapid mathematical processing of numerical research material by a wide range of scientific workers, including biologists and medical personnel who do not have special training. This can be done only if programs are available, however, and their writing requires special skills. A book, "Processing of Results of Biological Experiments with the Microcomputer 'Elektronika BZ-21,'" was published in 1979 by the "Naukova dumka" publishing house in Kiev, as an aid to scientists.

The "Elektronika BZ-21" is no longer in production, however. An improved version of it, the "Elektronika BZ-34," has appeared, and the latest model, the "Elektronika MK-54," is a pocket computer in the true sense of the word. But when will there be programs for these microcomputers?

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BIANCHOR SURFACE-ACTIVE AGENTS

Kiev DOKLADY AKADEMII NAUK UKRAINSKOY SSR. SERIYA B: GEOLOGICHESKIYE, KHIMICHESKIYE I BIOLOGICHESKIYE NAUKI in Russian No 10, Oct 84 (manuscript received 13 Jul 84) pp 44-47

LIPATOV, Yu. S., academician, Ukrainian SSR Academy of Sciences, FAYNERMAN, A. Ye., SHRUBOVICH, V. A. and SHEVCHENKO, V. V., Institute of Chemistry of High Molecular Weight Compounds, Ukrainian SSR Academy of Sciences, Kiev

[Abstract] A qualitatively new method is suggested for producing highly effective surfactants on the basis of bianchor compounds with flexible nonpolar chains between anchors. Bianchor compounds refer to substances whose molecules are anchored in the surface layer at both ends. The high surface activity of such compounds as sebacic acid results from the forced orientation of their hydrocarbon chains along the division boundary, at least in the form of a loop. Figure 1; references 14: 8 Russian, 6 Western.
[1616-6508]

ORIGINS OF SOVIET ACADEMY OF MEDICAL SCIENCES

Moscow LITERATURNAYA GAZETA in Russian 14 Nov 84, p 10

BYACHENKO, S., candidate of Biological Sciences

[Abstract] Description is presented of an interview with the President of the USSR Academy of Medical Sciences, Hero of Socialist Labor, Academician Nikolay Nikolayevich Blokhin, on the subject of the origin of the Academy. From its beginnings in the All-Union Institute of Experimental Medicine and the State Institute for Public Health through its evolution during the Second World War, Blokhin outlines the history of the Academy of Medical Sciences. Relationships between the academy and foreign scientists are also briefly discussed. Blokhin calls for improvement in the selection of students for medical institutes and increased pay for medical personnel as means of improving health care.
[117-6508]

UDC 547.514.48

SYNTHESIS OF 15-FLUORODEOXYPROSTAGLANDINS A_2 AND E_2 FROM PROSTAGLANDIN A_2 OF PLEXAURA HOMOMALLA

Moscow DOKLADY AKADEMII NAUK SSSR in Russian Vol 279, No 2, Nov 84 (manuscript received 12 Mar 84) pp 378-380

BEZUGLOV, V. V., SERKOV, I. V., GAFUROV, R. G., LLERENA, E. M., PASHINNIK, V. Ye., MARKOVSKIY, L. N. and BERGEL'SON, L. D., corresponding member, USSR Academy of Sciences, Institute of Bioorganic Chemistry imeni M. M. Shemyakin, USSR Academy of Sciences, Moscow; Institute of Physiologically Active Substances, USSR Academy of Sciences, Chernogolovka, Moscow Oblast; Institute of Organic Chemistry, UkSSR Academy of Sciences, Kiev

[Abstract] Analogs of prostaglandins containing a fluorine atom at position 15 were synthesized in order to produce modified prostaglandins having altered effects and resistant to 15-hydroxyprostaglandin dehydrogenase. A number of the 15-fluoroprostaglandins synthesized had high biological activity. One source of 15-fluoroprostaglandins is prostaglandin A_2 (I) present in large quantities in corals of the Caribbean Sea (P. homomalla). The pharmacologic properties of the 15-fluoro-15-deoxyprostaglandins A_2 and E_2 are presently being studied. References 8: 4 Russian, 4 Western.
[1625-6508]

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